

Odour Assessment
North Road, Manchester

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Executive Summary

Redmore Environmental Ltd was commissioned by Gavlis Group Ltd to undertake an Odour Assessment in support of a proposed residential development on land to the rear of 109 - 119 North Road, Manchester.

The site is located in proximity to an underground wastewater detention tank operated by United Utilities. Concerns have been raised that odour emissions from the tank may have the potential to cause loss of amenity for future residents of the development and act as a constraint to planning consent. A two-stage Odour Assessment was therefore undertaken to determine baseline conditions at the site and its suitability for the proposed end-use.

Three Field Odour Surveys were undertaken in order to assess odour impacts across the development site. An Odour Risk Assessment was also undertaken using a standard screening methodology to consider the potential risk of reduced amenity. The results of these two methods were combined and a number of additional factors considered to determine the significance of odour impact.

Based on the results of the staged assessment, the overall odour effects on the site are not considered to be significant. As such, odour is not considered to represent a constraint to planning consent for the proposed development.

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Appendix 1 - Curricula Vitae

1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Gavlis Group Ltd to provide an Odour Assessment in support of a proposed residential development on land to the rear of 109 - 119 North Road, Manchester.

1.1.2 The site is located in proximity to an underground wastewater detention tank operated by United Utilities (UU). Concerns have been raised that odour emissions from the tank may have the potential to cause loss of amenity for future residents of the development. An Odour Assessment has therefore been undertaken in order to determine baseline conditions at the site and consider its suitability for the proposed end-use.

1.2 Site Location and Context

1.2.1 The site is located on land to the rear of 109 - 119 North Road, at approximate National Grid Reference (NGR): 388011, 398684. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The proposals comprise the construction of 2 residential dwellings with associated garages and infrastructure. Reference should be made to Figure 2 for a site layout plan.

1.2.3 A planning application for the scheme was submitted to Manchester City Council (MCC) in August 2021 (reference: 131356/FO/2021). Following submission, a consultation response was received from UU which indicated concerns regarding the potential of odour loss of amenity at the development as a result of odour emissions from an underground wastewater detention tank located adjacent to the site. A two-stage Odour Assessment has therefore been undertaken to investigate potential odour impacts at the site and consider its suitability for the proposed end-use. This included three Field Odour Surveys and a Risk Assessment. The findings are detailed in the following report.

2.0 ODOUR BACKGROUND

2.1 Odour Definition

2.1.1 The Institute of Air Quality Management (IAQM) guidance¹ defines odour as:

"[...] the human olfactory response (perception followed by psychological appraisal) to one, or more often a complex mixture of, chemical species in the air."

2.1.2 The stated definition is considered to be relevant in the context of this assessment.

2.2 Odour Impacts

2.2.1 The magnitude of odour impact depends on a number of factors and the potential for complaints varies due to the subjective nature of odour perception. The **FIDOL** acronym (also stated as **FIDOR** in Environment Agency (EA) guidance²) is a useful reminder of the factors that will determine the degree of odour pollution. These are described by the IAQM³ as follows:

- **F**requency of detection - frequent odour incidents are more likely to result in complaints;
- **I**ntensity - the individual's perception of the strength of the odour;
- **D**uration - the overall duration that individuals are exposed to an odour over time;
- **O** odour unpleasantness - odour unpleasantness describes the character of an odour as it relates to the 'hedonic tone' (which may be pleasant, neutral or unpleasant) at a given odour concentration/ intensity. This can be measured in the laboratory as the hedonic tone, and when measured by the standard method and expressed on a standard nine-point scale it is termed the hedonic score; and,
- **L**ocation - the type of land use and nature of human activities in the vicinity of an odour source. Tolerance and expectation of the receptor. The 'Location' factor can

¹ Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

² H4: Odour Management, EA, 2011.

³ Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

be considered to encompass the receptor characteristics, receptor sensitivity, and socio-economic factors.

2.2.2 It is important to note that even infrequent emissions may cause loss of amenity if odours are perceived to be particularly intense or offensive.

2.2.3 The **FIDOL** factors can be further considered to provide the following issues in regards to the potential for an odour emission to cause a nuisance:

- The rate of emission of the compound(s);
- The duration and frequency of emissions;
- The time of the day that this emission occurs;
- The prevailing meteorology;
- The sensitivity of receptors to the emission i.e. whether the odorous compound is more likely to cause nuisance, such as the sick or elderly, who may be more sensitive;
- The odour detection capacity of individuals to the various compound(s); and,
- The individual perception of the odour (i.e. whether the odour is regarded as unpleasant). This is greatly subjective and may vary significantly from individual to individual. For example, some individuals may consider some odours as pleasant, such as petrol, paint and creosote.

2.3 Odour Legislative Control

2.3.1 The main requirement with respect to odour control from premises and infrastructure not controlled under the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments, such as the wastewater detention tank, is that provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

"Any dust, steam, odour or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."

2.3.2 Enforcement of the Act, in regard to nuisance, is currently under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the Local Authority is satisfied that a statutory

nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Environmental Protection Act (1990). The only defence is to show that the process to which the nuisance has been attributed and its operation are being controlled according to best practicable means.

2.4 National Planning Policy

2.4.1 The revised National Planning Policy Framework⁴ (NPPF) was published in July 2021 and sets out the Government's planning policies for England and how these are expected to be applied.

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

"c) An environmental objective - to protect and enhance our natural, built and historic environment; including making effective use of land, improving 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 12 of the NPPF details objectives in relation to achieving well-designed place. It states that:

"Planning policies and decisions should ensure that developments:

[...]

f) create places that are safe, inclusive and accessible and which promote health and well-being, with a high standard of amenity for existing and future users; and where crime and disorder, and the fear of crime, do not undermine the quality of life or community cohesions and resilience."

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

⁴ NPPF, Ministry of Housing, Communities and Local Government, 2021.

2.5 Local Planning Policy

2.5.1 The Core Strategy⁵ was adopted by MCC on 11th July 2012. It is the key document in the Local Development Framework and sets out the long term strategic policies for the Manchester's future development. A review of the Core Strategy indicated the following policy of relevance to this assessment:

"Policy DM 1 - Development Management

All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document:

[...]

- Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation [...]."

2.5.2 The above policy was taken into consideration throughout the undertaking of the assessment.

2.6 Institute of Air Quality Management Guidance

2.6.1 The IAQM published the 'Guidance on the Assessment of Odour for Planning'⁶ document on 20th May 2014. This was updated in 2018⁷ and specifically deals with assessing odour impacts for planning purposes, namely potential effects on amenity. The assessment methodology outlined in the guidance has been utilised in throughout this report where relevant.

⁵ Core Strategy, MCC, 2012.

⁶ Guidance on the Assessment of Odour for Planning, IAQM, 2014.

⁷ Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

3.0 BASELINE

3.1 Introduction

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

3.2 Site Description

3.2.1 The proposed development is located within the Clayton area of Greater Manchester, approximately 4km east of Manchester town centre. The site is bordered to the east and south by residential properties, to the west by open grassland and to the north by Barrington Street.

3.3 Potential Odour Sources

3.3.1 A desk top study was undertaken in order to identify potential odour sources in the vicinity of the development that required specific consideration during the assessment. These are summarised in Table 1.

Table 1 Potential Odour Sources

Source		Distance from Site (m)	Direction from Site	Description of Activities	Potential Emissions
1	Underground wastewater detention tank	Adjacent to the site	West	Wastewater processes	Odours associated with wastewater

3.3.2 As shown in Table 1, one potential odour source has been identified in the vicinity of the site. Reference should be made to Figure 3 for a map showing the source position.

3.4 Meteorological Conditions

3.4.1 The potential for atmospheric emissions to impact at sensitive locations depends significantly on the meteorology, particularly wind direction, during release. In order to consider prevailing conditions at the site, review of historical weather data was undertaken. Meteorological data used in the assessment was taken from Manchester Airport meteorological site at NGR: 381792, 384116, which is approximately 15.9km south-

west of the development. It is considered that conditions are likely to be reasonably similar over a distance of this magnitude and the information is a suitable source of data for an assessment of this nature.

- 3.4.2 Meteorological data was obtained from Manchester Airport meteorological site over the period 1st January 2015 to 31st December 2019 (inclusive). This is summarised in Table 2. Reference should be made to Figure 4 for a wind rose of the meteorological data.

Table 2 Wind Frequency Data

Wind Direction (°)	Frequency of Wind (%)
345 - 15	1.74
15 - 45	3.52
45 - 75	5.94
75 - 105	6.11
105 - 135	5.15
135 - 165	8.08
165 - 195	17.99
195 - 225	14.07
225 - 255	9.65
255 - 285	11.31
285 - 315	9.56
315 - 345	3.55
Sub-Total	96.66
Calms	1.93
Missing/Incomplete	1.41

- 3.4.3 All meteorological data used in the assessment was provided by Atmospheric Dispersion Modelling Ltd, which is an established distributor of meteorological data within the UK.
- 3.4.4 As shown in Table 2, the prevailing wind direction at the site is from the south with significant frequencies from the west. Winds from the north and east are relatively infrequent, which is indicative of conditions throughout the majority of the UK.

4.0 METHODOLOGY

4.1 Introduction

- 4.1.1 The development has the potential to expose future residents to any existing odour issues at the site. A two stage assessment has therefore been undertaken in accordance with the IAQM 'Guidance on the Assessment of Odour for Planning'⁸ document, as summarised in the following Sections. This approach was agreed with Rebecca Twigg-Purcell, Environmental Protection Officer at MCC, on 8th December 2021.

4.2 Field Odour Surveys

Background

- 4.2.1 An adverse effect of odour exposure, such as annoyance or loss of amenity, is subjective and is not something that can be wholly defined or assessed by scientific methods alone. An assessment can therefore be strengthened by including a subjective assessment of prevailing odour conditions by those directly affected or by experienced, trained, observers.
- 4.2.2 Sensory testing techniques use the human nose as the analytical sensor to enable the odour magnitude (as either intensity or concentration), frequency, duration and offensiveness of the odour to be recorded at a particular location at a specific time. This is a sound approach considering that no analytical instrument can currently give a unified measure of a complex mixture of compounds that quantifies it as a whole in the same way that a human experiences odour. Sensory testing also allows the character of the odour to be assessed, which is a great benefit when there are a number of different odour sources.
- 4.2.3 Subjective sensory tests, such as the Field Odour Survey, should not automatically be considered inferior to quantitative ambient monitoring. When carried out to a rigorous, well-designed methodology, the results of such sensory surveys can be expected to be robust and reproducible.

⁸ Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

Field Odour Survey Procedure

4.2.4 Sensory tests were carried out at a number of survey locations on 7th December 2021, 8th December 2021 and 9th December 2021. The survey positions for each site visit were chosen to provide an indication of conditions throughout the development site and in the immediate vicinity of the identified source. Reference should be made to Table 3 for a description of the survey positions and Figure 5 for a map of the locations.

Table 3 Description of the Survey Positions

Survey Position	Location
1	Centre of development site
2	Western boundary of development site
3	Eastern boundary of wastewater tank
4	Northern boundary of wastewater tank
5	Northern boundary of wastewater tank
6	Western boundary of wastewater tank
7	Southern boundary of wastewater tank
8	Southern boundary of wastewater tank

4.2.5 Monitoring was undertaken over a 5-minute period at each position. For each test location, the start time of the observation period, meteorological conditions and the attributes of the odour were recorded as follows:

- The assessor breathed normally, inhaling ambient air samples through the nose every 10-seconds, to give 30 samples over the 5-minute observation period;
- For each sample, the odour intensity was recorded using the scale outlined in Table 4.

Table 4 Odour Intensity Scale

Odour Strength	Intensity Level	Comments
No odour/not perceptible	0	No odour when compared to the clean site
Slight/very weak	1	There is probably some doubt as to whether the odour is actually present

Odour Strength	Intensity Level	Comments
Slight/weak	2	The odour is present but cannot be described using precise words or terms
Distinct	3	The odour character is barely recognisable
Strong	4	The odour character is easily recognisable
Very strong	5	The odour is offensive. Exposure to this level would be considered undesirable
Extremely strong	6	The odour is offensive. An instinctive reaction would be to mitigate against further exposure

- At the end of the observation period at the test location, the odour unpleasantness was noted by classifying it as unpleasant, neutral (neither pleasant nor unpleasant) or pleasant. This assumed that at least some of the 30 samples were of intensity 3 or more (i.e. the odour is at least 'barely recognisable');
- The odour descriptor and meteorological conditions were also noted;
- The pervasiveness/extent of the odour at the test location was assessed by calculating the percentage odour time, $t_{\geq 4}$, which is the number of samples where odour was recognisable divided by the total number of samples (i.e. 30). Note that 'recognisable odour' is where the odour strength exceeds the recognition threshold and is definitely recognisable by the assessor i.e. the assessor is capable of definitely identifying its quality/character, which corresponds to an intensity of 4 or more; and,
- The average odour intensity (I_{mean}) over the test period was calculated and the maximum intensity (I_{max}) noted.

4.2.6 The following additional factors were also adopted to safeguard the quality of the sensory assessments:

- The odour assessor would not have undertaken the assessment if they had a cold, sore throat, sinus trouble, etc;
- The odour assessor was not hungry or thirsty;
- The odour assessor did not work within half an hour of the end of their last meal;
- The odour assessor did not smoke or consume strongly flavoured food or drink, including coffee, for at least half an hour before the field odour survey was carried out, or during the survey;
- The odour assessor did not consume confectionery or soft drinks for at least half an hour before the field odour survey was carried out, or during the survey;

- Scented toiletries, such as perfume/aftershave were not used on the day of the field odour survey; and,
- The vehicle used during the field odour survey did not contain any deodorisers.

Odour Exposure

4.2.7 Following completion of the Field Odour Surveys, the matrix outlined in Table 5 was utilised to determine the level of odour exposure at each monitoring location.

Table 5 Odour Exposure

Average Intensity (I_{mean})	Percentage Odour Time ($t_{1\geq 4}$)				
	$\leq 10\%$	11% to 20%	21% to 30%	31% to 40%	$\geq 41\%$
6	Large	Very Large	Very Large	Very Large	Very Large
5	Medium	Large	Large	Very Large	Very Large
4	Small	Medium	Medium	Large	Large
3	Small	Medium	Medium	Medium	Medium
2	Small	Small	Medium	Medium	Medium
1	Small	Small	Small	N/A	N/A

4.2.8 It should be noted that I_{mean} was rounded to the nearest whole number.

4.2.9 The following overriding considerations also affect the scoring of the odour annoyance impact:

- If $I_{\text{mean}} = 0$, then the odour effect can for practical purposes be considered **negligible**; and,
- If $I_{\text{mean}} = 1$ but $t_{1\geq 4} = 0\%$, then the odour effect can for practical purposes be considered **negligible**.

Significance of Odour Effect

4.2.10 Following the determination of the odour exposure level, the significance of effect was determined through the interaction with receptor sensitivity, as outlined in Table 6.

Table 6 Odour Receptor Sensitivity

Sensitivity	Description
High	Surrounding land where: • Users can reasonably expect enjoyment of a high level of amenity; and, • People would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land Examples may include residential dwellings, hospitals, schools/education and tourist/cultural
Medium	Surrounding land where: • Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or, • People would not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land Examples may include places of work, commercial/retail premises and playing/recreation fields
Low	Surrounding land where: • The enjoyment of amenity would not reasonably be expected; or, • There is transient exposure, where the people would reasonably be expected to present only for limited periods of time as part of the normal pattern of use of the land Examples may include industrial use, farms, footpaths and roads

4.2.11 The assessment matrix is provided in Table 7.

Table 7 Odour Effect Significance

Overall Odour Exposure	Receptor Sensitivity		
	Low	Medium	High
Very Large	Substantial	Substantial	Substantial
Large	Moderate	Moderate	Substantial
Medium	Slight	Slight	Moderate
Small	Negligible	Negligible	Slight
Negligible	Negligible	Negligible	Negligible

4.3 **Risk Assessment**

Background

4.3.1 The basic concept of risk assessment is that the overall risk depends on the probability of an event occurring together with the likely consequences if it was to occur. For odour assessments the probability can be considered as the likelihood of exposure (impact), and the consequence can be considered to be the effect on the receptor if that exposure (impact) took place. These two facets can be summarised by the source-pathway-receptor concept.

4.3.2 Behind the source-pathway-receptor concept, is the fundamental relationship:

$$\text{Effect} \approx \text{Dose} \times \text{Response}$$

4.3.3 In the specific case of odour assessments, the dose can be considered equivalent to the odour exposure, or impact. This will be determined by FIDO of the FIDOL factors. The effect is the result of the changes on specific receptors (people in the case of odour) taking into account their sensitivities (i.e. responsiveness to odour), the L (location) in FIDOL is to categorise the sensitivity.

4.3.4 The IAQM guidance states that a qualitative risk-based approach is appropriate for:

- Screening of odour impacts;
- Development proposals likely to have a low risk of adverse effects;
- Situations where there is insufficient information to carry out detailed predictive dispersion modelling;
- Situations where the information has wide uncertainties and its use as input to a detailed predictive dispersion model would be at best a waste of time, money and effort or, worse, would lead to an illusory and false impression of accuracy and precision in the numbers generated; and,
- When the model is not able to properly represent the reality of the situation being assessed, e.g. if the odour effects are likely to be significantly influenced by accidental, unexpected, or unknown releases. In such instances a qualitative estimate may be more appropriate, on the basis that it is better to be broadly correct than precisely wrong.

4.3.5 It is considered that the first three criteria are met for this project. As such, a qualitative assessment methodology was deemed appropriate.

Risk Assessment Procedure

4.3.6 The first step in the assessment is to estimate the odour generating potential of the site activities. This is termed the Source Odour Potential, which takes into account three factors:

- The scale (magnitude) of the release from the odour source, taking into account the effectiveness of any odour control or mitigation measures that are already in place. This involves judging the relative size of the release rate after mitigation and taking account of any pattern of release (e.g. intermittency);
- How inherently odorous the emission is. In some cases it may be known whether the release has a low, medium or high Odour Detection Threshold (ODT). This is the concentration at which an odour becomes detectable to the human nose. In most instances the odours released by a source will be a complex mixture of compounds and the detectability will not be known. However, for some industrial processes the odour will be due to one or a small number of known compounds and the detection thresholds will be a good indication of whether the release is highly odorous or mildly odorous; and,
- The relative pleasantness/unpleasantness of the odour.

4.3.7 Using the example risk ranking in Table 8, the Source Odour Potential can be categorised as **small, medium** or **large**.

Table 8 Source Odour Potential

Source Odour Potential	Comments
Large	Magnitude - Larger Environmentally Permitted processes of odorous nature or large Sewage Treatment Works (STWs); materials usage hundreds of thousands of tonnes/m³ per year; area sources of thousands of m². The compounds involved are very odorous (e.g. mercaptans), having very low ODTs where known Unpleasantness - processes classed as "Most offensive" in EA Guidance H4⁹; or (where known) compounds/odours having unpleasant (-2) to very unpleasant (-4) hedonic score Mitigation/control - open air operation with no containment, reliance solely on good management techniques and best practice
Medium	Magnitude - smaller Environmentally Permitted processes or small STWs; materials usage thousands of tonnes/m³ per year; area sources of hundreds of m². The compounds involved are moderately odorous Unpleasantness - processes classed in EA Guidance H4 as "Moderately offensive"; or (where known) odours having neutral (0) to unpleasant (-2) hedonic score Mitigation/control - some mitigation measures in place, but significant residual odour remains
Small	Magnitude - falls below Environmental Permit Part B threshold; materials usage hundreds of tonnes/m³ per year; area sources of tens m². The compounds involved are only mildly odorous, having relatively high ODTs where known Unpleasantness - processes classed as "Less offensive" in EA Guidance H4; or (where known) compounds/odours having neutral (0) to very pleasant (+4) hedonic score Mitigation/control - effective, tangible mitigation measures in place leading to little or no residual odour

4.3.8 The next step is to estimate the effectiveness of the pollutant pathway as the transport mechanism for odour through the air to the receptor, versus the dilution/dispersion in the atmosphere. Any factor that increases dilution and dispersion of the plume as it travels from source to receptor will reduce the concentration at the end point, and hence reduce exposure. Important factors for consideration are:

- The distance between sensitive receptors and the odour source;
 - Whether receptors are downwind with respect to the prevailing wind direction.
- Odour episodes often tend to occur during stable atmospheric conditions with low wind speed, which gives poor dispersion and dilution. Receptors close to the source

⁹ H4: Odour Management, EA, 2011.

in all directions can be affected under these conditions. When circumstances are not calm, it will be the downwind receptors that are affected. As such, receptors that are downwind with respect to the prevailing wind direction tend to be at higher risk of odour impact;

- The effectiveness of the point of release in promoting good dispersion e.g. releasing emissions from a high stack will increase the pathway, dilution and dispersion; and,
- The topography and terrain between the source and receptor. The presence of topographical features such as hills and valleys, or urban terrain features such as buildings, can affect air flow and therefore increase, or inhibit, dispersion and dilution.

4.3.9 Using the example risk ranking in Table 9, the pollutant pathway from source to receptor can be categorised as **ineffective**, **moderately effective**, or **highly effective**.

Table 9 Pathway Effectiveness

Pathway Effectiveness	Comments
Highly effective	Distance - receptor is adjacent to the source/site; distance well below any official set-back distances Direction - high frequency of winds from source to receptor, or, qualitatively, receptors downwind of source with respect to prevailing wind Effectiveness of dispersion/dilution - open processes with low-level releases, e.g. lagoons, uncovered effluent treatment plant, landfilling of putrescible wastes
Moderately effective	Distance - receptor is local to the source Where mitigation relies on dispersion/dilution - releases are elevated, but compromised by building effects
Ineffective	Distance - receptor is remote from the source; distance exceeds any official set-back distances Direction - low frequency of winds from source to receptor, or, qualitatively, receptors upwind of source with respect to prevailing wind Where mitigation relies on dispersion/dilution - releases are from high level (e.g. stacks, or roof vents greater than 3m above ridge height) and are not compromised by surrounding buildings

4.3.10 The sensitivity of the receiving receptor is defined based on the criteria shown in Table 6.

4.3.11 The estimates of Source Odour Potential and Pathway Effectiveness are considered together to predict the risk of odour exposure (impact) at the receptor location, as shown by the matrix in Table 10.

Table 10 Risk of Odour Exposure

Pathway Effectiveness	Source Odour Potential		
	Small	Medium	Large
Highly effective	Low	Medium	High
Moderately effective	Negligible	Low	Medium
Ineffective	Negligible	Negligible	Low

4.3.12 The final step is to determine the significance of odour effect at the specified receptor location through the interaction between sensitivity and risk, as outlined in Table 11.

Table 11 Significance of Odour Effect

Risk of Odour Exposure	Receptor Sensitivity		
	Low	Medium	High
High	Slight	Moderate	Substantial
Medium	Negligible	Slight	Moderate
Low	Negligible	Negligible	Slight
Negligible	Negligible	Negligible	Negligible

4.4 Overall Odour Significance

4.4.1 Following completion of the Field Odour Surveys and Risk Assessment, the IAQM guidance¹⁰ states that a conclusion on the likely significance of the predicted impact should be reached. Where the overall effect is **moderate** or **substantial**, the effect is likely to be considered **significant**, whilst if the effect is **slight** or **negligible**, the impact is likely to be considered **not significant**. It should be noted that this is a binary judgement of either it is **significant** or it is **not significant**. This has been considered to determine the overall significance of potential odour effects at the development site.

4.4.2 The IAQM guidance recognises that assessment of odour requires some degree of professional judgement¹¹. Qualitative methodologies such as those utilised within this

¹⁰ Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

¹¹ Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

report provide guidance for assessing potential impacts. However, professional judgement should be exercised in order to take account of the specific details which are unique to each development. This has been considered as necessary throughout the assessment. The IAQM also suggest that the assessor's qualifications and experience are detailed within an Odour Assessment. These are provided in Appendix 1.

5.0 **RESULTS**

5.1 **Field Odour Surveys**

Field Odour Survey 1

- 5.1.1 Field Odour Survey 1 was undertaken between 08:20 and 09:01 on 7th December 2021. The results are summarised in Table 12.

Table 12 Field Odour Survey 1 - Results

Position	$f_{\geq 4}$ (%)	I_{mean}	I_{max}	Unpleasantness	Odour Description	Notes
1	0	0	1	N/A	-	-
2	0	0	0	N/A	-	-
3	0	0	1	N/A	-	-
4	0	0	2	N/A	Cigarette smoke	-
5	0	0	1	N/A	-	-
6	0	0	3	Unpleasant	Exhaust fumes, Vegetation	-
7	0	0	3	Unpleasant	Exhaust fumes	-
8	0	0	0	N/A	-	-

- 5.1.2 The meteorological conditions during the monitoring were dry and cloudy with temperatures of 3°C. The general wind direction was from the south-west throughout the survey. The wind speed rated between 1 and 3 on the Beaufort scale.

Field Odour Survey 2

- 5.1.3 Field Odour Survey 2 was undertaken between 14:51 and 15:27 on 8th December 2021. The results are summarised in Table 13.

Table 13 Field Odour Survey 2 - Results

Position	$t_{\geq 4}$ (%)	I_{mean}	I_{max}	Unpleasantness	Odour Description	Notes
1	0	0	1	N/A	-	-
2	0	0	1	N/A	-	-
3	0	0	1	N/A	-	-
4	0	0	2	N/A	Exhaust fumes	-
5	0	0	1	N/A	-	-
6	0	0	2	N/A	Exhaust fumes	-
7	0	0	2	N/A	Exhaust fumes	-
8	0	0	0	N/A	-	-

5.1.4 The meteorological conditions during the monitoring were wet and cloudy with temperatures of 5°C. The wind direction was from the west at locations 1, 2, 5 and 6, from the south-west at positions 3 and 4 and from the south at locations 7 and 8. The wind speed rated between 1 and 3 on the Beaufort scale.

Field Odour Survey 3

5.1.5 Field Odour Survey 3 was undertaken between 12:08 and 12:46 on 9th December 2021. The results are summarised in Table 14.

Table 14 Field Odour Survey 3 - Results

Position	$t_{\geq 4}$ (%)	I_{mean}	I_{max}	Unpleasantness	Odour Description	Notes
1	0	0	1	N/A	-	-
2	0	0	1	N/A	-	-
3	0	0	1	N/A	-	-
4	0	0	1	N/A	-	-
5	0	0	1	N/A	-	-
6	0	0	1	N/A	-	-
7	0	0	2	N/A	Exhaust fumes	-

Position	t _{≥4} (%)	I _{mean}	I _{max}	Unpleasantness	Odour Description	Notes
8	0	0	1	N/A	-	-

- 5.1.6 The meteorological conditions during the monitoring were dry and cloudy with temperatures of 6°C. The general wind direction was from the west throughout the survey. The wind speed rated between 1 and 3 on the Beaufort scale.

Odour Exposure and Significance

- 5.1.7 Following completion of the three Field Odour Surveys, odour exposure at each of the monitoring locations was determined. This is summarised in Table 15.

Table 15 Field Odour Surveys - Odour Exposure Risk

Position	Odour Exposure		
	Field Odour Survey 1	Field Odour Survey 2	Field Odour Survey 3
1	Negligible	Negligible	Negligible
2	Negligible	Negligible	Negligible
3	Negligible	Negligible	Negligible
4	Negligible	Negligible	Negligible
5	Negligible	Negligible	Negligible
6	Negligible	Negligible	Negligible
7	Negligible	Negligible	Negligible
8	Negligible	Negligible	Negligible

- 5.1.8 As shown in Table 15, odour exposure was **negligible** at all locations during all surveys.

- 5.1.9 The significance of the odour impact at each location was determined in accordance with the criteria outlined in Table 7. The proposed development includes residential dwellings and is therefore considered to be of **high** sensitivity.

- 5.1.10 The significance of the odour exposure results for the Field Odour Surveys is summarised in Table 16.

Table 16 Odour Significance

Position	Odour Exposure		
	Field Odour Survey 1	Field Odour Survey 2	Field Odour Survey 3
1	Negligible	Negligible	Negligible
2	Negligible	Negligible	Negligible
3	Negligible	Negligible	Negligible
4	Negligible	Negligible	Negligible
5	Negligible	Negligible	Negligible
6	Negligible	Negligible	Negligible
7	Negligible	Negligible	Negligible
8	Negligible	Negligible	Negligible

5.1.11 As shown in Table 15, impacts were classified as **negligible** at all locations during all surveys.

5.1.12 Reference should be made to Figure 6 for a graphical representation of the findings.

5.2 Risk Assessment

5.2.1 The odour risk at the development was assessed in accordance with the IAQM methodology. The first step was to classify the Source Odour Potential. This is outlined in Table 17.

Table 17 Source Odour Potential

Source		Source Odour Potential	Justification
1	Underground wastewater detention tank	Small	Odour emissions from the wastewater tank are not controlled under the Environmental Permitting (England and Wales) Regulations (2016) An odour benchmark level of 3.0ou_E/m³ as a 98th %ile of 1-hour means is typically utilised as an assessment criterion for impacts as a result of wastewater type odours. This corresponds to the 'moderately offensive' category in EA Guidance H4¹² The tank is located underground and all access points are covered by manholes. As such, wastewater is not exposed directly to atmosphere during normal operation

5.2.2 The pathway effectiveness was subsequently defined between the source and the development based on the distances between the locations and the prevailing wind direction in relation to the site. This is summarised in Table 18.

Table 18 Odour Pathway Effectiveness

Source		Pathway Effectiveness	Justification
1	Wastewater detention tank	Moderately effective	Receptor is local to the source High frequency of winds from the source to the receptor (41.7%) The tank is located underground and all access points are covered by manholes. As such, wastewater is not exposed directly to atmosphere during normal operation The tank and supporting infrastructure is likely provide effective containment of odour emissions generated by wastewater during normal operation

5.2.3 The proposed development includes residential land use and would therefore be considered to be of **high** sensitivity.

5.2.4 The above information has been used to assess odour risk from the source. This is summarised in Table 19.

¹² H4: Odour Management, EA, 2011.

Table 19 Odour Risk Assessment

Source		Source Odour Potential	Pathway Effectiveness	Exposure Risk	Sensitivity of Receptor	Effect Significance
1	Wastewater detention tank	Small	Moderately effective	Negligible	High	Negligible

5.2.5 As shown in Table 19, the predicted odour effect significance was **negligible** as a result of emissions from the wastewater detention tank.

6.0 **DISCUSSION**

6.1 **Field Odour Surveys**

6.1.1 As shown in Table 12 to Table 14, odours associated with exhaust fumes and vegetation were detected during the Field Odour Surveys. These odours are natural in nature and resulted in **negligible** impacts at all locations.

6.1.2 It is confirmed that no odours associated with emissions from the wastewater detention tank were detected during completion of any of the three Field Odour Surveys.

6.2 **Risk Assessment**

6.2.1 The Odour Risk Assessment indicated that the predicted odour effect significance was **negligible** as a result of emissions from the wastewater detention tank. This conclusion is due to a number of considerations, including the following:

- The small size of the odour source and associated activities;
- The proximity of the tank to the proposed development;
- Prevailing meteorological conditions at the site; and,
- The predicted level of containment of odour emissions from the source due the underground nature of the tank.

6.3 **Summary**

6.3.1 Three Field Odour Surveys were undertaken across the site in accordance with the IAQM methodology. The results indicated odour impacts were **negligible** at all survey locations across the development site.

6.3.2 The risk of potential odour effects at the development was also assessed using the IAQM methodology. This included consideration of the Source Odour Potential, pathway effectiveness and receptor sensitivity. The results of the assessment indicated the predicted odour effect significance was **negligible** at the development as a result of emissions from the wastewater detention tank.

6.3.3 The IAQM guidance¹³ states that only if the impact is **moderate** or **substantial**, the effect is considered **significant**. As **negligible** impacts were determined from the Field Odour Surveys and Risk Assessment, overall effects are considered to be **not significant**, in accordance with the stated methodology.

¹³ Guidance on the Assessment of Odour for Planning v1.1, IAQM, 2018.

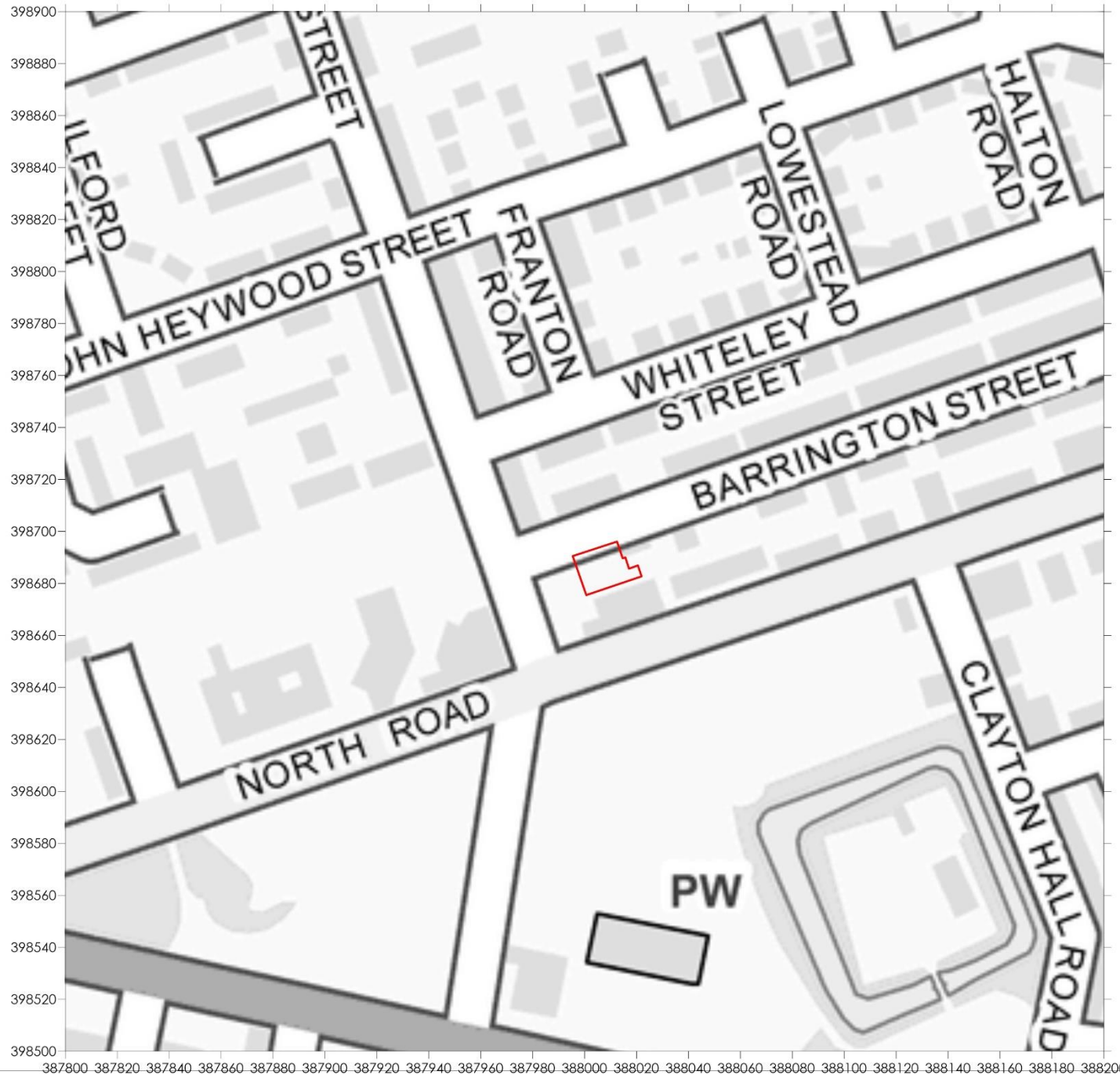
7.0 CONCLUSION

- 7.1.1 Redmore Environmental Ltd was commissioned by Gavlis Group Ltd to provide an Odour Assessment in support of a proposed residential development on land to the rear of 109 - 119 North Road, Manchester.
- 7.1.2 The site is located in proximity to a wastewater detention tank operated by UU. Concerns have been raised that odour emissions from the tank may have the potential to cause loss of amenity for future residents of the development. An Odour Assessment was therefore undertaken in order to determine baseline conditions at the site and consider its suitability for the proposed end-use.
- 7.1.3 Three Field Odour Surveys were undertaken in accordance with the IAQM methodology. The results indicated that odour impacts were **negligible** at all monitoring locations across the proposed development site and in the immediate vicinity of the wastewater tank.
- 7.1.4 The risk of potential odour effects at the development was assessed using the IAQM methodology. This included consideration of the Source Odour Potential, pathway effectiveness and receptor sensitivity. The results of the assessment indicated the predicted odour effect significance was **negligible**.
- 7.1.5 Based on the results of the staged assessment, the overall predicted odour effects on the site are considered to be **not significant**. As such, odour emissions from the wastewater detention tank are not considered to represent a constraint to planning consent for the development.

8.0 **ABBREVIATIONS**

DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
I _{max}	Maximum odour intensity
I _{mean}	Average odour intensity
IAQM	Institute of Air Quality Management
NGR	National Grid Reference
NPPF	National Planning Policy Framework
MCC	Manchester City Council
ODT	Odour Detection Threshold
t _{≥4}	Percentage odour time

Figures



Legend



Title

Figure 1 - Site Location Plan

Project

Odour Assessment
North Road, Manchester

Project Reference

5116

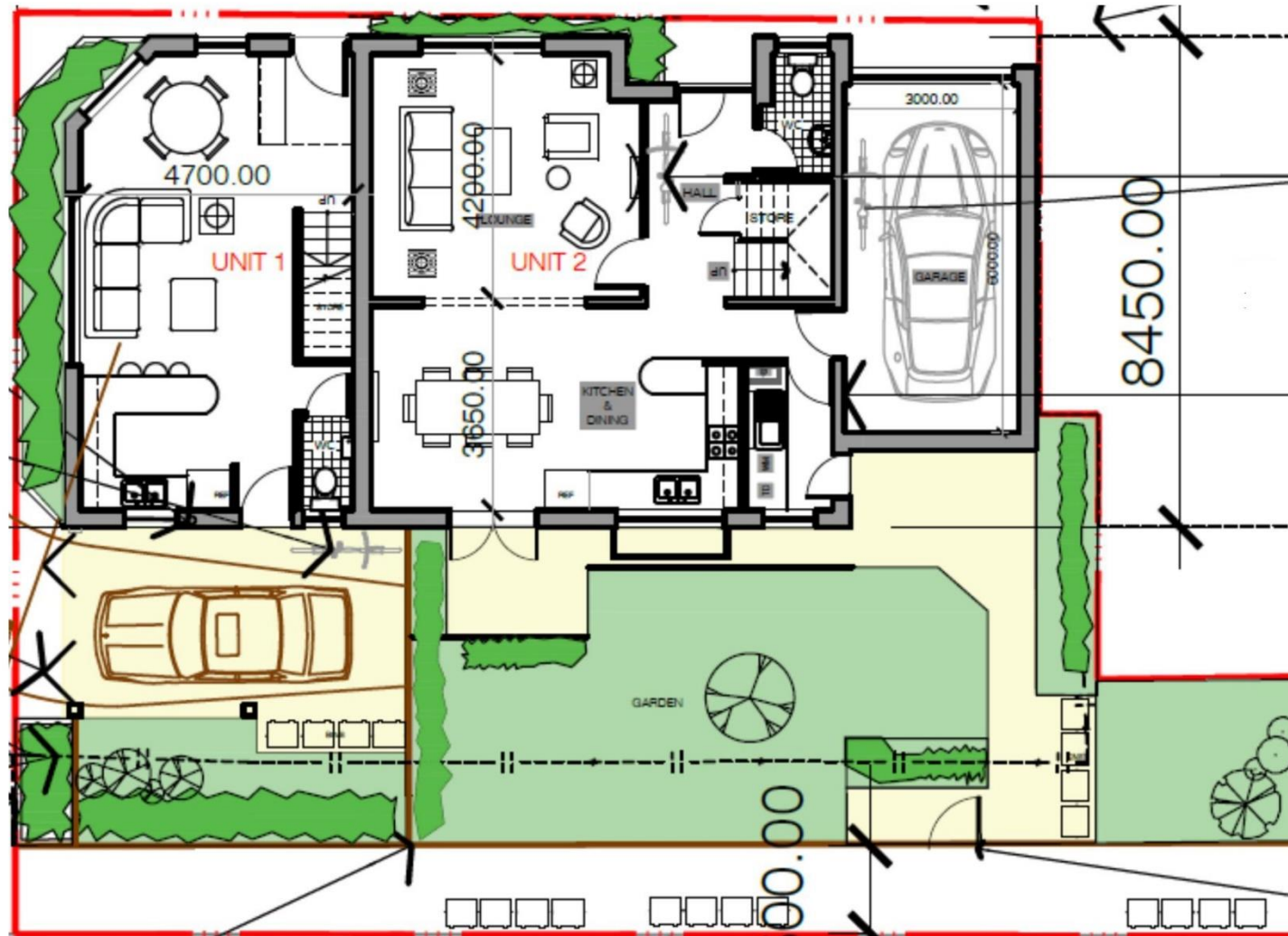
Client

Gavlis Group Ltd

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Legend



Site Boundary

Title

Figure 2 - Site Layout Plan

Project

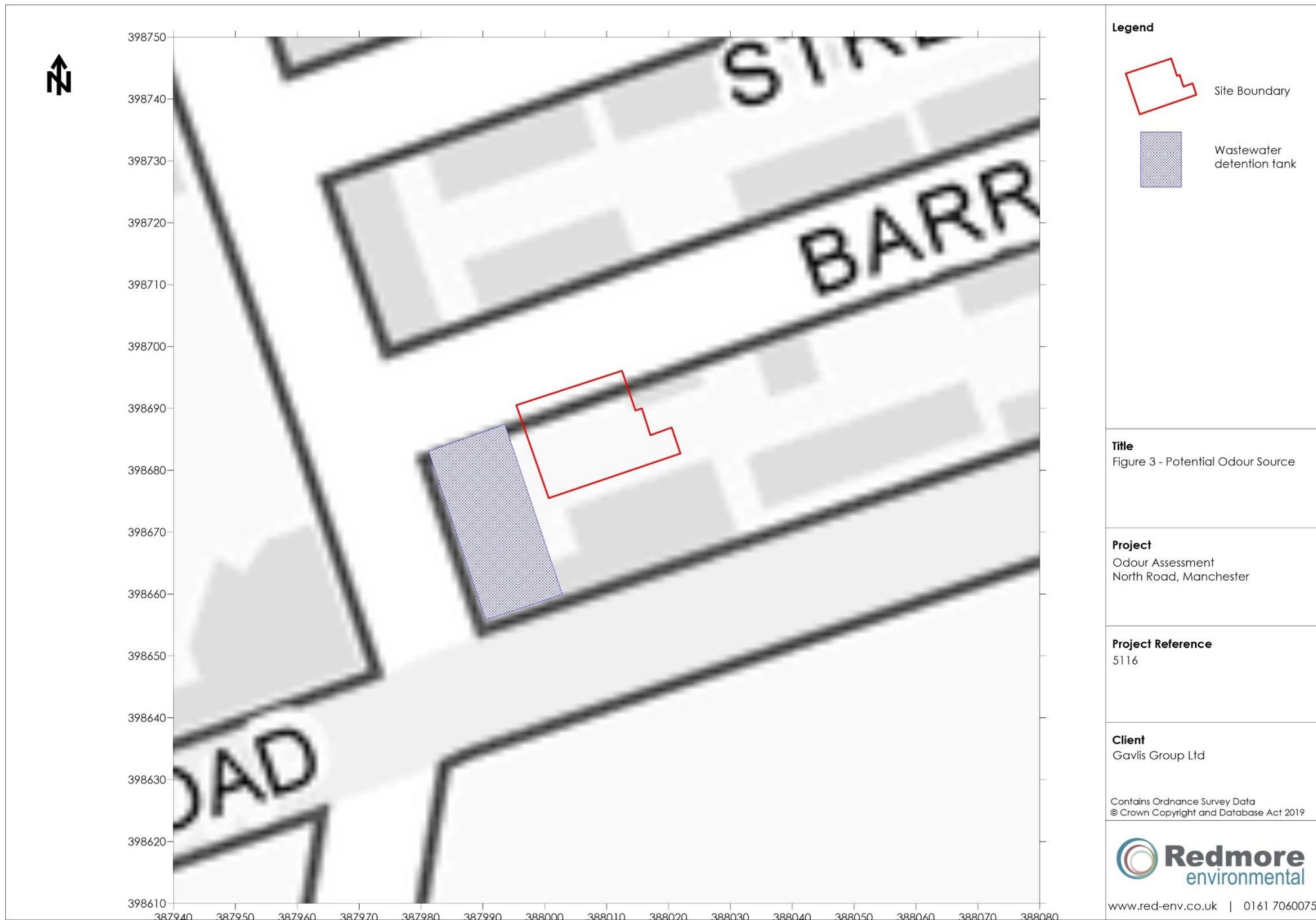
Odour Assessment
North Road, Manchester

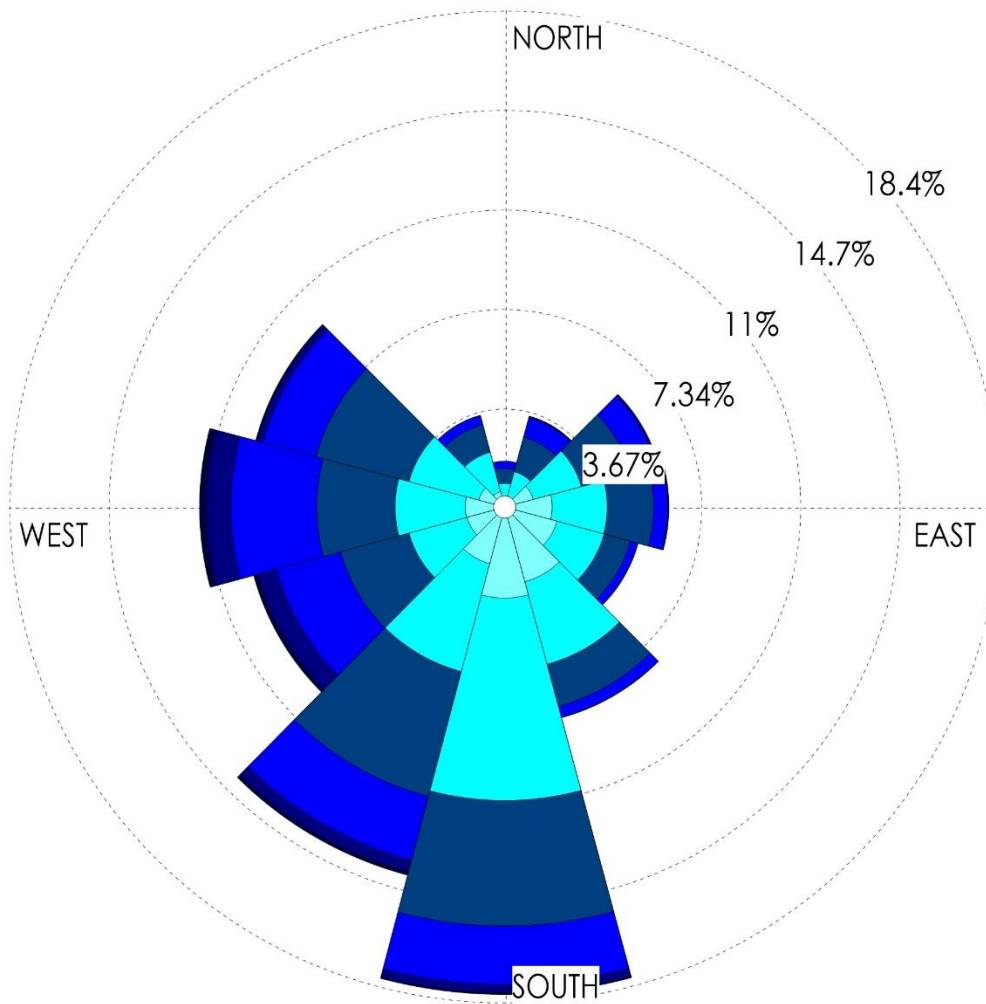
Project Reference

5116

Client

Gavlis Group Ltd





WIND SPEED
(m/s)

- >= 11.10
- 8.80 - 11.10
- 5.70 - 8.80
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 1.93%

Legend

Title

Figure 4 - Wind Rose of 2015 - 2019
Manchester Airport Meteorological
Data

Project

Odour Assessment
North Road, Manchester

Project Reference

5116

Client

Gavlis Group Ltd





Legend



Title

Figure 5 - Field Odour Survey Locations

Project

Odour Assessment
North Road, Manchester

Project Reference

5116

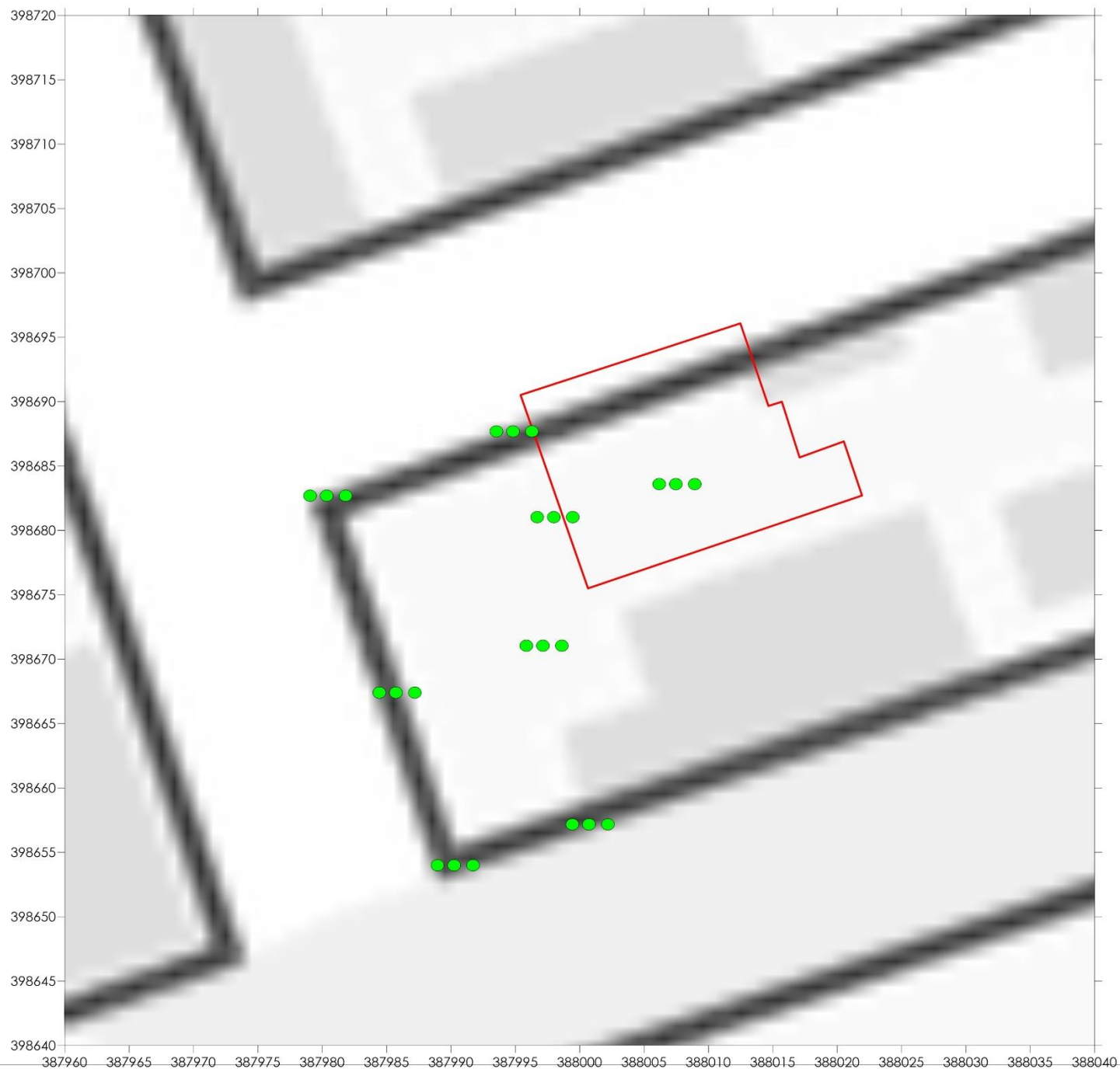
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-  Site Boundary
-  Negligible
-  Slight
-  Moderate
-  Substantial

Title

Figure 6 - Field Odour Survey Results

Project

Odour Assessment
North Road, Manchester

Project Reference

5116

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Date: 14th December 2021

Ref: 5116

Appendix 1 - Curricula Vitae

KEY EXPERIENCE:

Ger is an Associate Director with specialist experience in the odour sector. His key capabilities include:

- Production of Air Quality and Odour Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) and Institute of Air Quality Management (IAQM) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of industrial sources using ADMS-5 to determine impacts of emissions on local air quality and amenity as a consequence of odour.
- Odour sampling and analysis as part of performance testing for odour abatement plant and mitigation appraisal.
- Odour surveys to assess amenity and suitability of sites for residential development.
- Odour risk assessments to determine odour effect significance in accordance with IAQM Guidance.
- Modelling of road vehicle exhaust emissions using ADMS-Roads. Studies have included assessment of road traffic exhaust emissions on sensitive receptors and exposure of new residents to poor air quality.

SELECT PROJECTS SUMMARY:

Anaerobic Digestion Plant, Scottow, Norfolk

Odour Sampling and ammonia measurement at an Anaerobic Digestion (AD) facility in Scottow, Norfolk. Emissions testing work was carried out to assess the performance of abatement plant which serves a digestate drying system at the facility. Odour sampling and analysis was carried out in accordance with the requirements of BS EN 13725. The results were used to quantify reductions in odour and ammonia concentrations between untreated and treated air streams.

Residential Development, Ramsbottom

Odour Assessment to determine suitability of a site for residential development. Survey work was undertaken to odour sources in the vicinity of the site and to assess potential impacts at the proposed development. An Odour Risk Assessment was then carried out using standard screening methodology. Results revealed that odour emissions from nearby sources may have the potential to affect amenity levels at the completed development.

Energy from Waste Plant, Hull

A programme of Odour Monitoring and background pollutant concentration measurement was undertaken to collect baseline data prior to the operational phase of an Energy from Waste plant in Hull. The results revealed that baseline pollutant concentrations are within the range that can be expected in background air.

Whyte & Mackay Distillery, Invergordon

Odour Assessment in support of a planning application for an AD facility at the Whyte and Mackay Distillery, Invergordon. There is the potential for odour emissions from a number of sources at the plant. These were assessed using dispersion modelling in order to quantify impacts at sensitive locations in the vicinity of the site. The results indicated that residents should not be exposed to unacceptable levels of odour during the operation of the facility.

Cofresh Snack Foods, Leicester

Odour Assessment in support of the Cofresh Snack Foods facility, Leicester. Odours from a number of sources on site have the potential to cause impacts at sensitive locations. Odour sources were identified and site specific emission rates quantified during a measurement survey. Impacts were determined using dispersion modelling, the results were compared with the relevant odour benchmarks level and the significance of impacts assessed in accordance with industry guidance.

Café, Petersfield Drive, Manchester

Odour Assessment in support of the proposed change of use of an existing retail premises at Petersfield Drive, Manchester to a cafe. The Local Planning Authority indicated concerns regarding potential odour impacts associated with the proposed development. The potential odour impacts were determined based on DEFRA methodology for commercial kitchens and an appropriate level of mitigation was identified.

KEY EXPERIENCE:

Alicia is an Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments in accordance with Department for Environment, Food and Rural Affairs (DEFRA) methodologies for a range of residential, commercial and industrial sectors.
- Detailed dispersion modelling of road vehicle exhaust emissions using ADMS-Roads. Studies have included assessment of road traffic exhaust emissions on sensitive receptors and exposure of new residents to poor air quality.
- Advanced Canyon Modelling to evaluate the impact of altered urban topography on air quality in built up areas.
- Assessment of construction dust impacts from a range of development sizes.
- Production of air quality mitigation strategies specifically tailored to address issues at individual sites.
- Definition of baseline air quality and identification of sensitive areas across the UK.
- Odour surveys to assess amenity and suitability of sites for potential future development for residential use.
- Production of Damage Cost Assessments in accordance with DEFRA guidance.

SELECT PROJECTS SUMMARY:

Cross Street, Sale

Air Quality Assessment for the redevelopment of the former Trafford Magistrates Court to provide houses and apartments. Concerns were raised regarding the exposure of future occupants to poor air quality due to road traffic emissions. Dispersion modelling was therefore undertaken to quantify pollution levels at the development. Predicted concentrations were below the relevant Air Quality Objectives (AQO) at all sensitive locations across the development. Mitigation in the form of mechanical ventilation was therefore not required.

Church Street, Irthlingborough

Odour Impact Assessment in support of a hot food takeaway in Wellingborough. The assessment considered a number of factors, including the scale and nature of potential emissions, the location of nearest receptors and the proposed cooking type in accordance with the relevant DEFRA guidance. An appropriate ventilation system was identified and described on the basis of the assessment results.

Lewis Street, Cardiff

Air Quality Assessment in support of the construction of circa 30 residential units on land off Lewis Street, Cardiff. Concerns had been raised in relation to the potential exposure of future occupants to elevated pollution concentrations. Detailed dispersion modelling was subsequently undertaken using ADMS-roads to assess pollutant concentrations across the site. Results indicated that pollution levels were below the air quality standards across the site.

Leigham Court Road, Streatham

Air Quality Assessment in support of a mixed-use development located in an Air Quality Management Area (AQMA). Detailed dispersion modelling was undertaken with the inclusion of advanced canyon modelling to evaluate the impact of the urban topography on the dispersion of traffic related pollutants. Predicted concentrations of Nitrogen Dioxide (NO₂) were found to exceed the air quality criteria from ground to third floor level. As such, mitigation was specified for the affected units to ensure future residents would not be exposed to poor air quality.

Warning Tongue Lane, Doncaster

Air Quality Assessment in support of the construction of 220 residential units. The development had potential to cause air quality impacts at sensitive locations during construction and operation. Detailed dispersion modelling was therefore undertaken to consider the potential impact of the development on air quality at sensitive receptor locations within the vicinity of the site. Results indicated that impacts were not predicted to be significant at any sensitive receptor location. Suitable mitigation to control potential impacts associated with fugitive dust releases during construction was also identified.

Dearne Valley Parkway, Barnsley

Air Quality Assessment in support of an industrial development comprising three units. The development had the potential to cause impacts at sensitive locations. An assessment was therefore undertaken in order to determine baseline conditions and consider potential effects as a result of the proposals. Review of the results indicated an acceptable level of emissions from the scheme.