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AIR QUALITY ASSESSMENT
OLD POLICE STATION, 66 STATION ROAD, HAMPTON

REC REFERENCE: AQ107880R1

REPORT PREPARED FOR: HAMPTON CARE HOME LIMITED

DATE: AUGUST 2019

DELIVERING ENVIRONMENTAL
AND RISK MANAGEMENT SOLUTIONS

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EXECUTIVE SUMMARY

Resource and Environmental Consultants Limited was commissioned by Hampton Care Home Limited to undertake an Air Quality Assessment in support of the proposed redevelopment at the Old Police Station, 66 Station Road, Hampton.

The proposals comprise the construction of a new 67 bed care home with 22 care suites over 4 levels, alongside associated parking and infrastructure.

The site is located within an area identified by London Borough of Richmond upon Thames as experiencing elevated pollutant concentrations. Subsequently there is the potential for the proposals to introduce future site users into an area of high pollutant concentrations as well as to cause impacts during the operational and construction phases. As such, an Air Quality Assessment was required to quantify pollution levels across the site, consider its suitability for the proposed end-use and assess potential impacts as a result of the development.

Potential construction phase air quality from fugitive dust emissions were assessed as a result of demolition, earthworks, construction, and trackout activities from the site. These were assessed in accordance with the Greater London Authority methodology. On the basis that, appropriate mitigation measures are implemented, air quality impacts during the construction phase are considered to be acceptable for a development of this size and nature.

Dispersion modelling was undertaken in order to quantify pollutant concentrations at the site and to assess the potential for future users to be exposed to poor air quality. This indicated that pollutant levels across the site were below the standards at all locations across the development and as such did not exceed the air quality objectives.

Potential impacts during the operational phase of the development may occur due to road traffic exhaust emissions associated with vehicles travelling to and from the site. A screening assessment was therefore undertaken to determine the potential for trips generated by the development to affect local air quality. This indicated that impacts were anticipated to be not significant.

The London Plan states that new developments must be considered Air Quality Neutral. Pollutant emissions associated with traffic generated by the development were compared to relevant benchmarks. This indicated that transport emissions from the proposals were above the benchmarks and as such, further action will be required to tackle excess development emissions.

Based on the assessment results the site is considered suitable for the proposed end use and complies with the London Plan, Richmond Local Plan and relevant Greater London Authority legislation.

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APPENDICES

1. INTRODUCTION

1.1 Background

Resource and Environmental Consultants (REC) Limited (Ltd) was commissioned by Hampton Care Home Ltd to undertake an Air Quality Assessment in support of the proposed redevelopment at the Old Police Station, 66 Station Road, Hampton.

The proposals comprise the construction of a new 67 bed care with 22 Care Suites over 4 levels, alongside associated parking and infrastructure.

1.2 Site Location and Context

The site is located at Old Police Station, 66 Station Road, Hampton at approximate National Grid Reference (NGR): 513760, 169710. Reference should be made to Figure 1 within Appendix I for a location plan.

The proposed development site is located within the London Borough of Richmond upon Thames (LBRuT) Air Quality Management Area (AQMA) which has been declared for exceedances of the annual mean Air Quality Objective (AQO) for nitrogen dioxide (NO_2). Subsequently there is the potential for the proposals to introduce future site users into an area experiencing elevated pollutant concentrations as well as to cause impacts during the construction and operational phases. As such, an Air Quality Assessment was required in order to define baseline conditions, assess site suitability for the proposed end-use and consider potential impacts as a result of the development. This is detailed within the following report.

1.3 Limitations

This report has been produced in accordance with REC's standard terms of engagement. REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC; a charge may be levied against such approval.

2. LEGISLATION AND POLICY

2.1 European Legislation

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 objectives for particulate matter with an aerodynamic diameter of less than 2.5µm ($PM_{2.5}$). The consolidated Directives include:

- Directive 99/30/EC - the First Air Quality "Daughter" Directive - sets ambient Air Quality Limit Values (AQLVs) for NO_2, oxides of nitrogen (NO_x), sulphur dioxide, lead and particulate matter with an aerodynamic diameter of less than 10µm (PM_{10}).

2.2 UK Legislation

The Air Quality Standards (Amendment) Regulations (2016) came into force on 31st December 2016. These Regulations amend the Air Quality Standards Regulations 2010 and transpose the EU Directive 2008/50/EC into UK law. AQLVs were published in these regulations for 7 pollutants, as well as Target Values for an additional 6 pollutants.

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 2007[1]. 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 exceedances over a specified timescale. These are generally in line with the AQLVs, although the requirements for compliance vary slightly.

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

Table 1 Air Quality Objectives

Pollutant	Air Quality Objective	
	Concentration (µg/m³)	Averaging Period
NO_2	40	Annual mean
	200	1-hour mean; not to be exceeded more than 18 times a year
PM_{10}	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year
$PM_{2.5}$	25	Annual Mean

Table 2 summarises the advice provided in Greater London Authority (GLA) guidance LLAQM.TG (16)[2] on where the AQOs for pollutants considered within this report apply.

1 The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, DEFRA, 2007.
2 London Local Air Quality Management Technical Guidance 2016 LLAQM.TG (16), GLA, 2016.

Table 2 Examples of Where the Air Quality Objectives Apply

Averaging Period	Objectives Should Apply At	Objectives 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
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-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

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 administration under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves considering present and likely future air quality against the AQOs. If it is predicted that levels at sensitive locations where members of the public are regularly present for the relevant averaging period 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 (AQAP), the objective of which is to reduce pollutant concentrations in pursuit of the AQOs.

2.4 Dust

The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations (2018) are those provided in Section 79 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

> *"any dust, steam, smell or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance."*

Enforcement of the Act, in regard to nuisance, is currently under the administration of the local

Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the LA 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). Enforcement can insist that there be no dust beyond the boundary of the works. 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 practice measures.

2.5 National Planning Policy

2.5.1 National Planning Policy Framework

The National Planning Policy Framework3 (NPPF) was published on 24th July 2018 (updated in 19th February 2019) and sets out the Government's core policies and principles with respect to land use planning, including air quality. The document includes the following considerations which are relevant to this assessment:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *[…]*
>
> *Preventing both 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.*
>
> *Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."*

The implications of the NPPF have been considered throughout this assessment

2.5.2 National Planning Practice Guidance

The National Planning Practice Guidance[4] (NPPG) web-based resource was launched by the Department for Communities and Local Government to support the NPPF and make it more accessible. The air quality chapters were produced on 6th March 2014 and the relevant sections are highlighted below:

[3] National Planning Policy Framework, Department for Communities and Local Government, 2018.
[4] http://planningguidance.planningportal.gov.uk/

Paragraph 001 states that: *"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values" and "It is important that the potential impact of new development on air quality is taken into account, where the national assessment indicates that relevant limits have been exceeded or are near the limit". The role of Local Authorities under LAQM are stated and that Air Quality Action Plans should "identify measures that will be introduced in pursuit of the objectives"*

Paragraph 005 states that *"Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation*

Paragraph 007 states that *"Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality".In terms of mitigation, it states that "Mitigation options where necessary will be location specific, will depend on the proposed development and should be proportionate to the likely impact".*

Paragraph 009 shows a flow chart highlighting how the assessment of air quality impacts should fit into the development management process. It makes it clear that air quality impact risks, AQLVs and AQOs should be considered in the decision-making process.

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 London Plan

The Minor Alterations to The London Plan[5] was published in March 2016 and sets out a fully integrated economic, environmental, transport and social framework for the development of the capital until 2031. London boroughs' local plans need to be in general conformity with the London Plan, and its policies guide decisions on planning applications by councils and the Mayor.

The London Plan policies relating to air quality are outlined below:

- ***Policy 3.2 Improving health and addressing health inequalities***
- ***Policy 5.3 - Sustainable design and construction***
- ***Policy 7.14 - Improving air quality***

These policies have been considered throughout the completion of this Air Quality Assessment.

2.6.2 The Draft London Plan

The Draft New London Plan sets out the proposed development strategy for London from 2019 to 2041. It was consulted from 29th November 2017 until 2nd March 2018. A review of the Draft New London Plan indicated the following policy in relation to air quality:

[5] The London Plan, Minor Alterations to the London Plan, Greater London Authority, March 2016.

- ***Draft Policy SI1 Improving air quality***

This policy has been considered throughout the undertaking of this Air Quality Assessment. However, it should be noted that the plan carries limited weight in the determination of this application.

2.6.3 Local Planning Policy

As part of the Local Development Framework, LBRuT adopted their New Local Plan[6] in July 2018. The Local Plan sets out the spatial vision, objectives, development strategy and a series of strategic policies that will guide the scale, location and type of development within the borough until 2036.

A review of the New Local Plan indicated the following policy in relation to air quality that is relevant to this assessment:

> ***"Policy LP 8 Amenity and Living Conditions***
>
> *All development will be required to protect the amenity and living conditions for occupants of new, existing, adjoining and neighbouring properties. The Council will:*
>
> *[…]*
>
> *4. Ensure there is no harm to the reasonable enjoyment of the use of buildings, gardens and other spaces due to increases in traffic, servicing, parking, noise, light, disturbance, air pollution, odours or vibration or local micro-climatic effects.*
>
> ***"Policy LP10: Local Environmental Impacts, Pollution and Land Contamination***
>
> *A. The Council will seek to ensure that local environmental impacts of all development proposals do not lead to detrimental effects on the health, safety and the amenity of existing and new users or occupiers of the development site, or the surrounding land. These potential impacts can include, but are not limited to, air pollution, noise and vibration, light pollution, odours and fumes, solar glare and solar dazzle as well as land contamination.*
>
> *Air Quality*
>
> *A. The Council promotes good air quality design and new technologies. Developers should secure at least 'Emissions Neutral' development. To consider the impact of introducing new developments in areas already subject to poor air quality, the following will be required:*
>
> *1. an air quality impact assessment, including where necessary, modelled data;*
>
> *2. mitigation measures to reduce the development's impact upon air quality, including the type of equipment installed, thermal insulation and ducting abatement technology;*

[6] Richmond Local Plan 2018, London Borough of Richmond

3. *measures to protect the occupiers of new developments from existing sources;*

4. *strict mitigation for developments to be used by sensitive receptors such as schools, hospitals and care homes in areas of existing poor air quality; this also applies to proposals close to developments used by sensitive receptor*

Reference has been made to this policy during the undertaking of this Air Quality Assessment by assessing pollutant concentrations across the development site and at nearby sensitive receptors, as well as undertaking the required Air Quality Neutral (AQN) assessment.

3. METHODOLOGY

The proposed development has the potential to cause air quality impacts during the construction and operational phases in addition to exposing future site users to elevated pollution levels.

3.1 Construction Phase Assessment

There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the GLA document 'The Control of Dust and Emissions during Construction and Demolition Supplementary Planning Guidance'[7].

Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

- Demolition
- Earthworks;
- Construction; and
- Trackout

The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in exposure to PM_{10}.

The assessment steps are detailed below.

3.1.1 Step 1

Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the site boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should proceed to Step 2. Additionally, should ecological receptors be identified within 50m of the boundary site or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should also proceed to Step 2.

Should sensitive receptors not be present within the relevant distances then **negligible** impacts would be expected and further assessment is not necessary.

3.1.2 Step 2

Step 2 assesses the risk of potential dust impacts. A site is allocated to a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high

[7] The Control of Dust and Emissions During Construction and Demolition Supplementary Planning Guidance, GLA, 2016.

sensitivity (Step 2B).

The two factors are combined in Step 2C to determine the risk of dust impacts without the application of best practice mitigation measures.

3.1.3 Step 3

Step 3 requires the identification of site-specific mitigation measures within the GLA guidance to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

3.1.4 Step 4

Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

The determination of significance relies on professional judgement and reasoning should be provided as far as practicable. This has been considered throughout the assessment when defining predicted impacts.

The relevant GLA[7] construction phase assessment criteria are provided in Appendix III, which details the magnitude of dust emissions, as well as the sensitivity of the surrounding area with regards to dust soiling and to human health impacts. The GLA[7] guidance also suggests the provision of details of the assessor's qualifications and experience. These are provided in Appendix IV.

3.2 Operational Phase Impact Assessment

3.2.1 Future Exposure

The proposed development includes sensitive land uses and is located within an AQMA and within close proximity to the local highway network. As such, the proposals have the potential to introduce new receptors into an area of existing poor air quality. Detailed dispersion modelling was therefore undertaken to quantify NO_2, PM_{10} and $PM_{2.5}$ concentrations across the site and determine suitability for the proposed end-use. Reference should be made to Appendix II for details of the assessment inputs.

The results of the dispersion modelling assessment were compared against the Air Pollution Exposure Criteria (APEC) contained within the London Councils Air Quality and Planning Guidance[8] from the London Air Pollution Planning and the Local Environment (APPLE) working group. These are outlined in Table 3.

Table 3 Air Pollution Exposure Criteria

Category	Applicable Range	Recommendation
APEC - A	Below 5% of the annual mean AQO	No air quality grounds for refusal; however, mitigation of any emissions should be considered
APEC - B	Between 5% below or above the annual mean AQO	May not be sufficient air quality grounds for refusal, however appropriate mitigation must be considered e.g. maximise distance from pollutant source, proven ventilation systems, parking considerations, winter gardens, internal layout considered and internal pollutant emissions minimised
APEC - C	Above 5% of the annual mean AQO	Refusal on air quality grounds should be anticipated, unless the LA has a specific policy enabling such land use and ensure best endeavours to reduce exposure are incorporated. Worker exposure in commercial/industrial land uses should be considered further. Mitigation measures must be presented with air quality assessment, detailing anticipated outcomes of mitigation measures

It should be noted that significant areas of London would fall under APEC - C due to high NO_2 concentrations throughout the city. As such, a presumption against planning consent in these locations may result in large areas of land becoming undevelopable and prevent urban regeneration. The inclusion of suitable mitigation measures to protect future users is therefore considered a suitable way to progress sustainable schemes in these locations and has been considered within this assessment.

3.2.2 Road Vehicle Exhaust Emissions

The development has the potential to impact on existing air quality as a result of road traffic exhaust emissions, such as NO_2, PM_{10} and $PM_{2.5}$ associated with vehicles travelling to and from the site. A screening assessment was therefore undertaken using the criteria contained within the Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) 'Land-Use Planning & Development Control: Planning for Air Quality (2017)'[9] guidance documents to determine

[8] London Councils Air Quality and Planning Guidance, London Councils, 2007.
[9] Land-Use Planning & Development Control: Planning for Air Quality, EPUK and IAQM, January 2017 Update.

the potential for trips generated by the development to affect local air quality.
The EPUK and IAQM guidance9 document states the following criteria to help establish when an air quality assessment is likely to be considered necessary:

- Proposals that will cause a change in Light Duty Vehicle (LDV) flows of more than 100 AADT within or adjacent to an AQMA or more than 500 elsewhere;
- Proposals that will cause a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 elsewhere;
- Proposals that would realign roads within an AQMA by more than 5m;
- Proposals that will introduce new junctions or remove existing junctions near relevant receptors;
- Proposals that will introduce or change a bus station or change flows of buses by more than 25 AADT within an AQMA or more than 100 AADT elsewhere;
- Proposals which will include an underground car park with extraction system which will be within 20m of a relevant receptor and have more than 100 movements per day;

Should these criteria not be met, then the EPUK and IAQM guidance[9] documents consider air quality impacts associated with a scheme to be **not significant** and no further assessment is required. Should screening of the traffic data indicate that any the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the predicted change in NO_2 and PM_{10} 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 EPUK and IAQM guidance[9].

3.2.3 Combustion Emissions Impacts

The development includes the provision of on-site energy generating facilities, which may have the potential to impact on existing air quality. The following information has been provided by the appointed mechanical engineer, and is set to be installed as part as the scheme:

- **2No. XRGI15 CHP – Rated at 29.96kW (Min/Max)**
  - *NOx emissions 209mg/kWh or 2.582mg/s (combined)*

- **3No Ideal Evomax 150kW Boiler.– Rated at 30kW to 170.5kW (Min/Max)**
  - *NOx emissions 38.1Mg/kWh or 2.71mg/s (combined)*
  - *Max Flue Gas Flow Rate 240.7m^3/h*

Following the above specifications, a screening assessment was undertaken following the criteria provided within the EPUK and IAQM[9] guidance documents to determine whether a detailed assessment of energy emissions is required.

The EPUK and IAQM[9] document states the following criteria to establish when an air quality assessment is likely to be considered necessary:

- Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec[(a)] is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion.

- In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

- Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable.

  a) *As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NO_x gas boiler or a 30kW CHP unit operating at <95mg/Nm^3.*

Should these criteria not be met, then the guidance document considers air quality impacts associated with the energy generating facilities to be **not significant** and no further assessment is required.

Should screening of the energy emissions breach the above criteria, then potential impacts at sensitive receptor locations can be assessed by calculating the predicted change in pollutant concentrations as a result of the operation of the plant facility. The significance of predicted impacts can then be determined in accordance with the methodology outlined in the EPUK and IAQM guidance[9].

3.3 Air Quality Neutral

An assessment was undertaken to compare benchmark emissions with the proposed site use emissions in accordance with the methodology outlined within the GLA 'Air Quality Neutral Planning Support'[10]. The methodology is outlined below:

The following potential scenarios have been considered within the assessment:

- Benchmark; and
- Development.

The benchmark scenario is representative of annual NO_x and PM_{10} benchmark emissions, which are target emissions as defined by the GLA guidance[10]. The development scenario is representative of the annual NO_x and PM_{10} emissions from the operation of the proposed development only.

The following emission source was considered during the assessment:

- **Transport Emissions** - road vehicles travelling to and from the site; and
- **Building Emissions** - on-site energy generation

3.3.1 Transport Emissions

3.3.1.1 Benchmark

The Transport Emissions Benchmark (TEB) for the development is calculated using the GLA guidance[10] based on the land use classes associated with the proposed development. The TEBs for each land use class for a development within Outer London are provided in the GLA guidance[10] and are summarised in Table 4.

[10] Air Quality Neutral Planning Support: GLA 80371, Air Quality Consultants Ltd in association with ENVIRON UK Ltd, 2014.

Table 4 Transport Emission Benchmarks

Land Use Category	NO_x TEB (g/m^2/year)	PM_{10} TEB ((g/m^2/year)
C3 – Residential (Care Homes)	155	267

No emissions benchmarks are provided in the documentation for Care Home developments, therefore to provide an estimate, Residential benchmarks were used as it was considered as a best representation of expected traffic generation from the development.

3.3.1.2 Development Emissions

The development Total Transport Emissions is compared against the development specific TEB in order to determine if the development site is considered to be Air Quality Neutral. Annual vehicle emissions for the development are calculated based on the anticipated traffic generation for the development, with the standard emission factors and the average distance travelled by car per trip for a development within Outer London The emissions factors and the average distance travelled were taken from the GLA guidance[10] and are summarised in Table 5 and Table 6, respectively.

Table 5 Air Quality Neutral Road Transport Emission Factors

Pollutant	g/vehicle-km in Outer London
NO_x	0.353
PM_{10}	0.0606

Table 6 Average Distance Travelled by Car per Trip

Land Use Category	Average Distance (km)
C2 - Residential	11.4

3.3.2 Building Emissions

Similarly, to the TEB, the Building Emissions Benchmark (BEB) has been calculated based on the land use classes associated with the proposed development. The BEB for each development land use class are provided in the GLA guidance[10] and are summarised in Table 7.

Table 7 Building Emission Benchmarks

Land Use Category	NO_x BEB (g/m^2/year)
C3 - Residential	26.2

4. BASELINE

Existing air quality conditions in the vicinity of the proposed development were identified in order to provide a baseline for assessment. These are detailed in the following sections.

4.1 Local Air Quality Management

As required by the Environment Act (1995), LBRT has undertaken Review and Assessment of air quality within their area of administration. This process has indicated that annual and hourly mean concentrations of NO_2, and PM_{10} concentrations are above the AQOs within the borough. As such, an AQMA has been declared, which is described as:

"Richmond AQMA - The whole Borough."

The development is located within the Richmond AQMA. As such, there is the potential for the development to introduce future site users to elevated NO_2 and PM_{10} concentrations as well as cause impacts to air quality within this sensitive area. This has been considered within this report.

LBRuT has concluded that concentrations of all other pollutants considered within the AQS are currently below the relevant AQOs and as such no further AQMAs have designated.

4.2 Air Quality Monitoring

LBRuT undertakes monitoring of pollutant concentrations using both periodic and continuous techniques throughout their area of administration. A review of the most recent Air Quality Annual Status Report[11] indicates that there are four automatic analysers operated by LBRuT, the closest of which is NPL - Teddington AURN (Suburban), located approximately 2km southwest of the site, at NGR: 515542, 170420. Due to the distance between the development site and automatic analyser, similar pollutant concentrations would not be expected and as such, this monitoring station has not been considered further within this assessment.

LBRuT utilise passive diffusion tubes to monitor NO_2 concentrations throughout their borough. A review of the most recent Air Quality Annual Status Reports indicated that there are two diffusion tube located within 500m of the proposed site. Recent monitoring results from these locations are shown in Table 13.

Table 8 Diffusion Tube Monitoring Results

Site ID	Site Name	Type	NGR (m)		Annual Mean NO_2 Concentration ($\mu g/m^3$)		
			X	Y	2016	2017	2018
Site 2	Percy Rd, Hampton (nr. Oldfield Rd)	Roadside	513229	169712	31.00	29.00	32.00
Site 34	Thames St, Hampton	Roadside	513787	169492	36.00	35.00	32.00

[11] London Borough of Richmond upon Thames - Air Quality Annual Status Report for 2018, July 2019.

As indicated in Table 8, the annual mean AQO for NO_2 was not exceeded at any of the nearby diffusion tubes in recent years. Reference should be made to Figure 2 within Appendix I for a graphical representation of the monitoring locations.

4.3 Background Pollutant Concentrations

The total concentration of a pollutant is comprised of explicit local emission sources (such as roads and industrial sources) and the background component. The background component consists of indeterminate sources which are transported into an area from further away by meteorological conditions. Background pollutant concentrations are therefore the ambient level of pollution that is not affected by local sources of pollution.

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: 513500, 169500. NO_2 data was downloaded from the DEFRA website[12] for the purpose of this assessment and is summarised in Table 9 for the verification year (2018) and the predicted development opening year (2021).

Table 9 Predicted Background Pollutant Concentrations

Pollutant	Predicted Background Concentration (µg/m3)	
	2018	2021
NO_x	27.34	23.94
NO_2	18.58	23.94
PM_{10}	15.60	15.01
$PM_{2.5}$	11.06	10.59

As shown in Table 9, background concentrations of NO_2 did not exceed the relevant AQOs. Comparison with the monitoring results indicates the impact that vehicle exhaust emissions from the highway network have on pollutant concentrations at roadside locations.

4.4 Sensitive Receptors

A sensitive receptor is defined as any location which may be affected by changes in air quality as a result of a development. These have been defined for construction dust impacts in the following Sections.

[12] http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html.

4.4.1 Construction Phase Sensitive Receptors

There are no nationally or European designated ecological receptors within 50m of the Site boundary, or within 50m from a route used by construction vehicles on the public highway (up to 500m from the Site entrance). Therefore, the risk of dust effects at a nationally or European designated ecological receptor site from construction impacts is not considered further in the assessment.

Human receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk-top study of the area up to 350m from the development boundary. These are summarised in Table 10.

Table 10 Demolition, Earthworks and Construction Dust Sensitive Receptors

Distance from Site Boundary (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	10 - 100	0
20 - 50	10 - 100	0
50 - 100	More than 100	-
100 - 350	More than 100	-

Reference should be made to Figure 3 for a graphical representation of demolition, earthworks and construction dust buffer zones.

Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area up to 50m from the road network within 500m of the site access. These are summarised in Table 11. The exact construction vehicle access routes were not available for the purpose of this assessment as they will depend on sourcing of materials. This is likely to be decided by the contractor. However, it was assumed construction traffic would access the site from Coombe Road to ensure the maximum potential trackout distance was considered.

Table 11 Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Less than 20	More than 100	0
20 - 50	More than 100	0

Reference should be made to Figure 4 for a graphical representation of trackout dust buffer zones.

A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in Table 12.

Table 12 Additional Area Sensitivity Factors

Guidance	Comment
Whether there is any history of dust generating activities in the area	The proposal is located in an area with commercial and residential uses. As such, there is likely to have been a history of dust generating activities due to redevelopment in the locality, as well as dust generated from commuting activities.
The likelihood of concurrent dust generating activity on nearby sites	A review of the Richmond Planning Portal indicated that there are no large-scale development within 500m of the development site. As such, there is a little risk of concurrent dust generation from nearby developments
Pre-existing screening between the source and the receptors	There is sparse vegetation present along all the boundaries of the site to provide little screening to receptors in all directions
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place	The wind direction is predominantly from the south-west of the development, as shown in Figure 5 within Appendix I. As such, properties to the north-east of the proposed development would be most affected by dust emissions
Conclusions drawn from local topography	The topography of the area appears to be predominantly flat. As such, there are no constraints to dust dispersion
Duration of the potential impact, as a receptor may become more sensitive over time	Currently it is unclear as to the duration of the construction phase. However, given the development opening year of 2021, it is unlikely to extend over one year
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline

5. ASSESSMENT

5.1 Construction Phase Assessment

5.1.1 Step 1 – Screening

The undertaking of activities such as demolition excavation, ground works, cutting, construction, concrete batching and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from haul road and highway surfaces.

The desk-study detailed in Section 3.1 identified a number of highly sensitive receptors within 350m of the site boundary, and within 50m of the anticipated trackout routes. As such, a detailed assessment of potential dust impacts was required, and summarised in the below sections.

Reference should be made to Appendix III for details of the relevant GLA[5] construction phase assessment criteria, which were utilised in conjunction with site specific information.

5.1.2 Step 2A – Magnitude

The scale and nature of the works was determined to assess the magnitude of dust arising from each construction phase activity. The determination of magnitude was based upon the criteria detailed in Appendix III, with the outcome of Step 2A is summarised below in Table 13.

Demolition

The proposed development will include the demolition of existing buildings. The volume of buildings to be demolished is likely to be less than 20,000m^3. With this considered the magnitude of potential dust emissions related to demolition activities is ***small***.

Earthworks

The proposed development site is estimated to cover an approximate area of 2,800m^2. Based on this information the magnitude of potential dust emissions related to earthwork activities is therefore considered ***medium.***

Construction

The proposals comprise the construction of 67 care home units and 22 care suits, given the scale of the development the total building volume is likely to be greater than 100,000m^3. The magnitude of potential dust emissions related to construction activities is therefore considered ***medium.***

Trackout

Information on the number of HDV trips to be generated during the construction phase of the development was not available at the time of assessment. Similarly, the surface material and unpaved road length was not known at this stage of the project. Based on the site area, it is anticipated that the unpaved road length is likely to between 50m and 100m. The magnitude of potential dust emissions from trackout is therefore ***medium.***

Table 13 Dust Emission Magnitude

Magnitude of Activities			
Demolition	**Earthworks**	**Construction**	**Trackout**
Small	Medium	Large	Medium

5.1.3 Step 2B – Sensitivity

The next step (Step 2B) is to determine the sensitivity of the surrounding area, based on general principles such as amenity and aesthetics, as well as human exposure sensitivity.

Dust Soiling

As shown in Table 10 and Table 11, the desk top study indicated there are ***10 -100*** sensitive receptors within 20m of the proposed development boundary, and ***More than 100*** within 20m of the anticipated trackout routes. Based on the assessment criteria detailed in Appendix III, the sensitivity of the receiving environment to potential dust soiling impacts was considered to be ***high*** *for all construction phase activities*.

Human Health

The annual mean concentration of PM_{10} is less than 24 µg/m^3 as detailed in Table 9.

Given the presence of ***10-100*** sensitive receptors within 20m of the proposed development boundary, and ***More than 100*** within 20m of the anticipated trackout routes. Based on the assessment criteria detailed in Appendix III, the area is considered to be of ***low*** for all construction activities and **medium** for trackout activities.

Based on the assessment criteria detailed in Appendix III and given the presence of ***10 - 100*** sensitive receptors within 20m of the proposed development boundary, and ***More than 100*** within 20m of the anticipated trackout routes, the area is considered to be of ***low*** sensitivity for demolition, construction and earthwork activities and **medium** for trackout activities.

There are no ecological receptors within 50m of the site or trackout boundary. As such, ecological impacts have not been assessed further within this report.

The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria detailed in Appendix III is summarised in **Table 14**

Table 14 Sensitivity of the Surrounding Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Soiling	High	High	High	High
Human Health	Low	Low	Low	Medium

5.1.4 Step 2C – Risk

Both the magnitude and sensitivity factors are combined in Step 2C to determine the risk of dust impacts without the application of best practice mitigation measures.

It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the site boundary closest to each sensitive area. Therefore, actual risk is likely to be lower than that predicted during the majority of the construction phase. A summary of the risk from each dust generating activity is provided in Table 15.

Table 15 Summary of Potential Unmitigated Dust Risks

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	Medium
Human Health	Negligible	Low	Low	Low

5.1.5 Step 3 – Mitigation

Following the identification of specific risk categories, the GLA[5] guidance provides a number of potential mitigation measures to reduce impacts during each activity of the construction phase. These measures have been adapted for the development site as summarised in Table 16. The mitigation measures outlined in Table 16 can be reviewed prior to the commencement of construction works incorporated into the existing the strategies as applicable.

Table 16 Fugitive Dust Mitigation Measures

Issue	Control Measure
Site Management	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. • Develop a Dust Management Plan. • Display the name and contact details of person(s) accountable for air quality pollutant emissions and dust issues on the site boundary. • Display the head or regional office contact information. • Record and respond to all dust and air quality pollutant emissions complaints. • Make a complaints log available to the local authority when asked. • Carry out regular site inspections to monitor compliance with air quality and dust control procedures, record inspection results, and make an inspection log available to the local authority when asked. • Increase the frequency of site inspections by those accountable for dust and air quality pollutant emissions issues when activities with a high potential to produce dust and emissions and dust are being carried out, and during prolonged dry or windy conditions. • Record any exceptional incidents that cause dust and air quality pollutant emissions, either on or off the site, and the action taken to resolve the situation is recorded in the log book.

Issue	Control Measure
Preparing and maintaining the site	• Plan site layout: machinery and dust causing activities should be located away from receptors. • Erect solid screens or barriers around dust activities or the site boundary that are, at least, as high as any stockpiles on site. • Fully enclosure site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Install green walls, screens or other green infrastructure to minimise the impact of dust and pollution. • Avoid site runoff of water or mud. • Keep site fencing, barriers and scaffolding clean using wet methods. • Remove materials from site as soon as possible. • Cover, seed or fence stockpiles to prevent wind whipping. • Carry out regular dust soiling checks of buildings within 100m of site boundary and cleaning to be provided if necessary • Agree monitoring locations with the Local Authority • Where possible, commence baseline monitoring at least three months before phase begins. • Put in place real-time dust and air quality pollutant monitors across the site and ensure they are checked regularly
Operating vehicle/machinery and sustainable travel	• Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone. • Ensure all non-road mobile machinery (NRMM) comply with the standards set within this guidance. • Ensure all vehicles switch off engines when stationary – no idling vehicles. • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where possible. • Impose and signpost a maximum-speed-limit of 10mph on surfaced haul routes and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate). • Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Operations	• Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. • Ensure an adequate water supply on the site for effective dust/particulate matter mitigation (using recycled water where possible). • Use enclosed chutes, conveyors and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate • Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Issue	Control Measure
Waste Management	• Reuse and recycle waste to reduce dust from waste materials • Avoid bonfires and burning of waste materials.
Demolition	• Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). • Ensure water suppression is used during demolition operations. • Avoid explosive blasting, using appropriate manual or mechanical alternatives • Bag and remove any biological debris or damp down such material before demolition.
Earthworks	• Re-vegetate earthworks and exposed areas • Use Hessian, mulches or trackifiers where it is not possible to re-vegetate • Only remove the secure covers in small areas during work and not all at once
Construction	• Avoid scabbling (roughening of concrete surfaces) if possible • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place
Trackout	• Regularly use a water-assisted dust sweeper on the access and local roads, as necessary, to remove any material tracked out of the site • Avoid dry sweeping of large areas • Ensure vehicles entering and leaving sites are covered to prevent escape of materials • Inspect on-site haul routes for integrity, instigate necessary repairs and record in site log book • Install hard surfaced haul routes which are regularly damped down • Implement a wheel washing system at a suitable location near site exit • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits • Access gates to be located at least 10m from receptors, where possible • Apply dust suppressants to locations where a large volume of vehicles enter and exit the construction site

5.1.6 Step 4 – Residual Impacts

Assuming the relevant mitigation measures outlined in Table 16 are fully implemented, the residual effect from all dust generating activities is predicted to be **not significant**, in accordance with the GLA guidance.

5.2 Operational Phase Assessment

The proposed development has the potential to expose future occupants to elevated pollution levels given its location with the LBRuT AQMA. This has been assessed through detailed dispersion modelling, with the results presented in the following Sections. This dispersion modelling process was undertaken using the assessment input details contained within Section 3.

Reference should be made to Appendix II for full assessment input details.

Predicted Concentrations at the Development Site

Annual mean NO_2 and PM_{10} concentrations were predicted across the development for the 2021 DS scenario at a height of 1.5m to represent exposure across the ground floor level, as shown in Figures 6 and 7 within Appendix I.

5.2.1 Nitrogen Dioxide – Annual Mean

Annual mean NO_2 concentrations across the ground floor level are summarized in Table 17.

Table 17 Predicted Annual Mean NO_2 Concentrations at the Development Site

Height	Predicted Annual Mean NO_2 Concentration Range (µg/m^3)	APEC Category
Ground Floor	19.52 – 23.02	A

Table 17 indicates that predicted NO_2 concentrations did not exceed the annual mean AQO across the ground floor level of proposed development site. Pollutant cconcentrations are therefore classified as APEC - A (no air quality grounds for refusal) as in accordance with the London Councils Air Quality and Planning Guidance[5]

Background NO_2 levels are likely to be lower at elevated heights due to increased distance from emission sources, such as the local road network. Therefore, predicted concentrations at heights above the ground floor level are considered to be acceptable in regards to pollutant exposure and have not been assessed further.

Predictions of 1-hour NO_2 concentrations were not produced as part of the dispersion modelling assessment. However, as stated in LLAQM (TG16)[2] if annual mean NO_2 concentrations are below 60µg/m^3 then it is unlikely that the 1-hour AQO will be exceeded. As such based on the results it is not predicted that concentration will exceed the 1 hour mean AQO for NO_2 across the development site.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for the proposed use without the implementation of mitigation techniques to protect future site users from elevated NO_2 concentrations.

5.2.2 Particulate Matter (PM_{10}) - Annual Mean

Annual mean PM_{10} concentrations across the ground floor level are summarised in Table 18.

Table 18 Predicted Annual Mean PM_{10} Concentrations

Floor	Predicted Annual Mean PM_{10} Concentration Range (µg/m^3)	APEC Category
Ground Floor	15.69 – 16.06	A

Table 18 indicates that predicted PM_{10} concentrations did not exceed the annual mean AQO across the ground floor level of proposed development site. Pollutant cconcentrations are therefore classified as APEC - A (no air quality grounds for refusal) as in accordance with the London Councils Air Quality and Planning Guidance[5]

Similar to NO_2, it is considered that PM_{10} concentrations are likely to be lower at elevated heights due to increased distance from emission sources, such as road. Therefore, predicted concentrations at elevations above the ground floor level have not been included within this assessment.

Based on the results of the dispersion modelling assessment, the site is considered to be suitable for the proposed use without the implementation of mitigation techniques to protect future site users from annual mean PM_{10} concentrations.

5.2.3 Particulate Matter ($PM_{2.5}$) – Annual Mean

$PM_{2.5}$ has not been modelled within the assessment as the predicted concentrations relating to annual mean PM_{10} remain below the AQO for $PM_{2.5}$ (25µg/m^3). Since PM_{10} contains all particulate matter with an aerodynamic diameter of less than 10µm, $PM_{2.5}$ is effectively accounted for within these predictions; and at worst could be considered that $PM_{2.5}$ concentrations would be equal to the predicted PM_{10} concentrations.

5.2.4 Road Traffic Exhaust Emissions

Any additional vehicle movements associated with the proposed development will generate exhaust emissions, such as NO_2, PM_{10} and $PM_{2.5}$ on the local and regional road networks.

Based on the information provided by Paul Mew Associates, the development will result in additional AADT flow of 61. Therefore, it is not anticipated the development will result in a change of AADT flows of more than 100, or produce over 25 HDV movements per day. Furthermore, it is not considered that average speeds on the local road network significantly affect.

As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are likely to be **not significant**, in accordance with the EPUK and IAQM[13] screening criteria shown in Section 3; and have not been considered further during the preparation of the dispersion modelling assessment.

5.2.5 Combustion Emissions Impact Assessment

The development has the provision for on-site energy generating facilities in the form of 2 CHP systems and 3 gas condensing boilers, which may have the potential to impact on existing air quality. Details on the proposed equipment specified by the mechanical engineer is listed below:

[13] Land-Use Planning & Development Control: Planning for Air Quality, EPUK and IAQM, January 2017.

- **2No. XRGI15 CHP – Rated at 29.96kW (Min/Max)**
  - *NOx emissions 209mg/kWh or 2.58mg/s (combined)*

- **3No Ideal Evomax 150kW Boiler.– Rated at 30kW to 170.5kW (Min/Max)**
  - *NOx emissions 38.1Mg/kWh or 2.71mg/s (combined)*
  - *Max Flue Gas Flow Rate 240.7m^3/h*

As a result, the proposals will provide a combined combustion plant with a total NO_x emission rate of **6.59mg/s.** Following the indicative criteria presented in the IAQM guidance[9] and detailed in section 3.2.3, impacts associated with the operation of the gas condensing boilers can be deemed **not significant** given that the NO_x emission rate is only marginally above the suggest threshold of **5.0mg/s**. Additionally, existing NO_2 concentrations do not exceed 30µg/m^3, emissions associated with the energy centre are unlikely to give rise to impacts.

5.3 Air Quality Neutral Assessment

The proposals comprise the redevelopment of a C2 Residential development across 3 floor levels Plus Basement. The impact of which is assessed in the following sections.

5.3.1 Transport Emissions

5.3.1.1 Benchmarks

The development specific TEB has been calculated using the GLA guidance[10] standard TEB for the proposed land use of the development, as outlined in Table 4, and the floor area of proposed land use.

The number of proposed dwelling was provided by Meedhurst Project Management Limited. The development specific TEB is also detailed in Table 19.

Table 19 Transport Emission Benchmarks

Land Use Category	Quantity (dwellings)	TEB - NO_x per Land Use (g/dwelling/year)	TEB - PM_{10} per Land Use (g/dwelling/year)
C2 – Residential	89	1553	267

As indicated in Table 19, the total annual NO_x emission TEB is **138.2kg/year** and the total annual PM_{10} emission TEB is **23.8kg/year**.

5.3.1.2 Development Emissions

The Total Transport Emissions for the proposed development were calculated based on the standard emission factors and the average distance travelled by car per trip outlined in Table 5 and Table 6, respectively and utilising the traffic data provided by Paul Mew Associates. The development Total Transport Emissions are summarised in Table 20.

Table 20 Development Total Transport Emissions

Land Use Category	Net 24-hour AADT Flow	NO_x Emission (kg/year)	PM_{10} Emission (kg/year)
C2 - Residential	61	86.90	15.38

The development specific TEBs was then subtracted from the development Total Transport Emissions to determine if the development transport emissions are within the benchmark. The results are summarised in Table 21.

Table 21 Comparison of Total Transport Emissions with Transport Emission Benchmarks

Scenario	NO_x Emission (kg/year)	PM_{10} Emission (kg/year)
Development Specific TEB	138.22	23.76
Development Total Transport Emission	89.60	15.38
Difference	-48.62	-8.38

As indicated in Table 21, annual NO_x and PM_{10} road vehicle exhaust emissions associated with the development are predicted to be **below** the TEB by **48.62kg/yr** for NO_x and **8.38kg/yr** for PM_{10}.

5.3.2 Building Emissions

5.3.2.1 Benchmarks

The inputs outlined in Table 7 and the information on the floor areas of each land use class associated with the development were utilised to calculate the development specific BEBs, which are outlined within Table 22. As mentioned previously, the floor areas were provided by Meedhurst Project Management Limited.

Table 22 Development Specific Building Emission Benchmarks

Land Use Category	Quantity (m^2)	BEB - NO_x per Land Use (kg/year)
C3 - Residential	5,058.0	132.5

As indicated in Table 22, the development specific BEB for annual NO_x emissions is **132.5kg/year**.

5.3.2.2 Development Emissions

The development Total Building Emission is summarised in Table 23.

Table 23 Development Total Building Emission

Source	NO_x Emissions (kg/yr)
Boilers (Combined)	126.6
CHP (Combined)	81.4
Total	208.0

The development specific BEB was then subtracted from the development Total Building Emission to determine if the development energy emissions are within the benchmark. The results are summarised in Table 24.

Table 24 Comparison of Total Building Emission with Building Emission Benchmark

Scenario	NO_x Emission (kg/year)
Development Specific BEB	132.5
Development Total Building Emission	208.0
Difference	**75.5**

As indicated in Table 24, annual NO_x energy emissions associated with the development are **above** the development specific BEB by **75.5kg/year.**

5.3.3 Air Quality Neutral Assessment Summary

A summary of the outcomes as a result of the comparisons between both the development Total Transport Emission and Total Building Emission with the development specific TEB and BEB is outlined in Table 25.

Table 25 Air Quality Neutral Summary

Scenario	Total NO_x Pollutant Emission (kg/year)	Total PM_{10} Pollutant Emission (kg/year)
Road Transport Outcome	-48.62	-8.38
Energy Outcome	75.5	-
Total Difference	**26.9**	**-8.4**

As indicated within Table 25, the total development pollutant emissions associated with both road vehicle and energy emissions are above both the development specific TEB and BEB by **26.9kg/year** for NO_x and below the TEB by **8.4kg/year** for PM_{10}. As such, the proposed development is not considered to be Air Quality Neutral and subsequently, further action will be required to offset pollutant emissions associated with the development. Mitigation measures to reduce emissions may be applied on-site or off-site. Where this is not practical or desirable, some form of pollutant off-setting could be applied.

6. MITIGATION

There are a number of air quality mitigation options available to reduce the excess NOx emissions associated with the operation of the proposed development.

Further Mitigation

The proposed development will affect NOx emissions from the site when compared with the current situation. This change was therefore quantified through an Air Quality Neutral assessment, as detailed in Section 5.3.2. This assessment showed that total annual NO_x and PM_{10} emissions are predicted to be above the combined benchmark level by **18.5kg/yr**. As such, further action is required to tackle the excess emissions. Mitigation measures to reduce excess development emissions from additional road traffic associated with the development will include 3 electric charging points as well as infrastructure for a further 6 in the future.

In addition to the above, some form of pollutant off-setting could be applied at the development, which could include green planting/walls and screens with special consideration given to plant species that absorbs or supresses' pollutants.

7. CONCLUSION

REC Ltd was commissioned by Hampton Care Home Ltd to undertake an Air Quality Assessment in support of the proposed redevelopment at the Old Police Station, 66 Station Road, Hampton.

The proposals comprise the construction of a new 67 bed Care Home with 22 Care Suites over 4 levels, alongside associated parking and infrastructure.

During the construction phase of the development there is the potential for air quality impacts as a result of fugitive dust emissions from the site. These were assessed in accordance with the GLA methodology. Assuming good practice dust control measures are implemented, the residual potential air quality impacts from dust generated by demolition, construction and trackout activities was predicted to be **not significant**.

Dispersion modelling was also undertaken in order to quantify pollutant concentrations at the site. Concentrations of NO_2 and PM_{10} were predicted at ground floor level. This indicated that concentrations of NO_2 and PM_{10} across the ground floor level of the proposed development were categorised as APEC - A. The location is therefore considered suitable for the proposed end-use without the inclusion of mitigation methods to protect future users from poor air quality.

The GLA states that new developments must be considered Air Quality Neutral. Pollutant emissions associated with anticipated traffic flow were compared to relevant benchmarks. This indicated building emissions from the proposals were above the benchmarks and as such, further action will be required to tackle the excess development emissions such as the proposed 3 EV charging points and infrastructure for a further 6, as well as Green landscaping.

Based on the assessment results the site is considered suitable for the proposed end use and complies with the London Plan, the LBRuT Local Plan and relevant GLA legislation.

8. ABBREVIATIONS

AADT	Annual Average Daily Traffic
ADM	Atmospheric Dispersion Modelling
AQAP	Air Quality Action Plan
AQLV	Air Quality Limit Value
AQMA	Air Quality Management Area
AQO	Air Quality Objectives
AQS	Air Quality Strategy
CERC	Cambridge Environmental Research Consultants
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EPUK	Environmental Protection UK
EU	European Union
GLA	Greater London Authority
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LA	Local Authority
LBRuT	London Borough of Richmond upon Thames
LLAQM	London Local Air Quality Management
NGR	National Grid Reference
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5µm
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10µm
REC	Resource and Environmental Consultants
TEB	Transport Emissions Benchmark
TEMPRO	Trip End Model Presentation Program
z_0	Roughness Length

APPENDIX I FIGURES

Legend

Site Boundary

Title

Figure 1

Site Location

Project

Air Quality Assessment
Old Police Station, 66 Station Road
Hampton

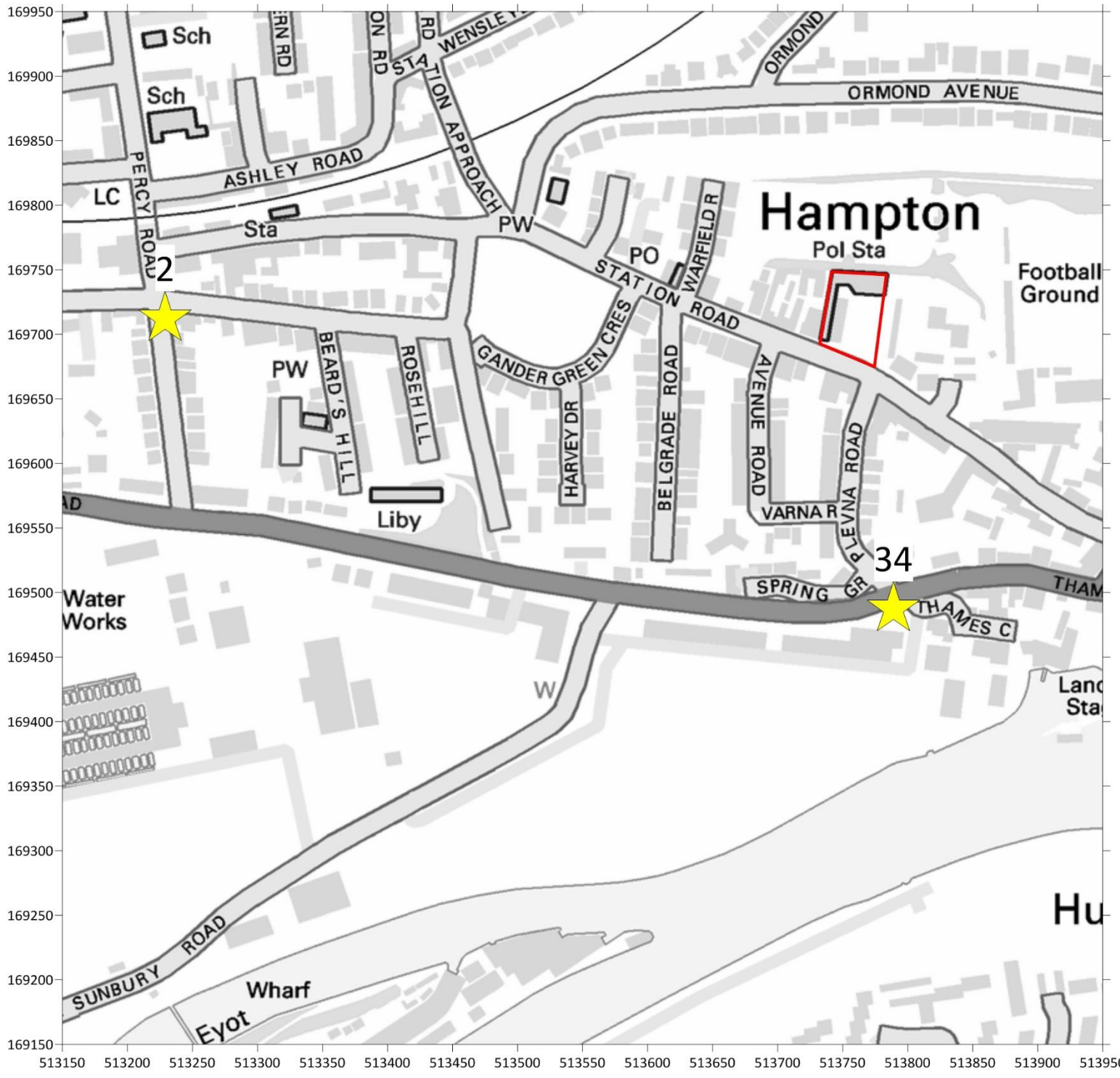
Project Number

AQ107880

Client

Hampton Care Home Limited

REC
Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE
Tel – 0161 868 1300 Fax – 0161 868 1301
www.recltd.co.uk



Legend

Site Boundary

Diffusion Tube Monitoring Locations

Title

Figure 2

Diffusion Tube Monitoring Locations

Project

Air Quality Assessment
Old Police Station, 66 Station Road
Hampton

Project Number

AQ107880

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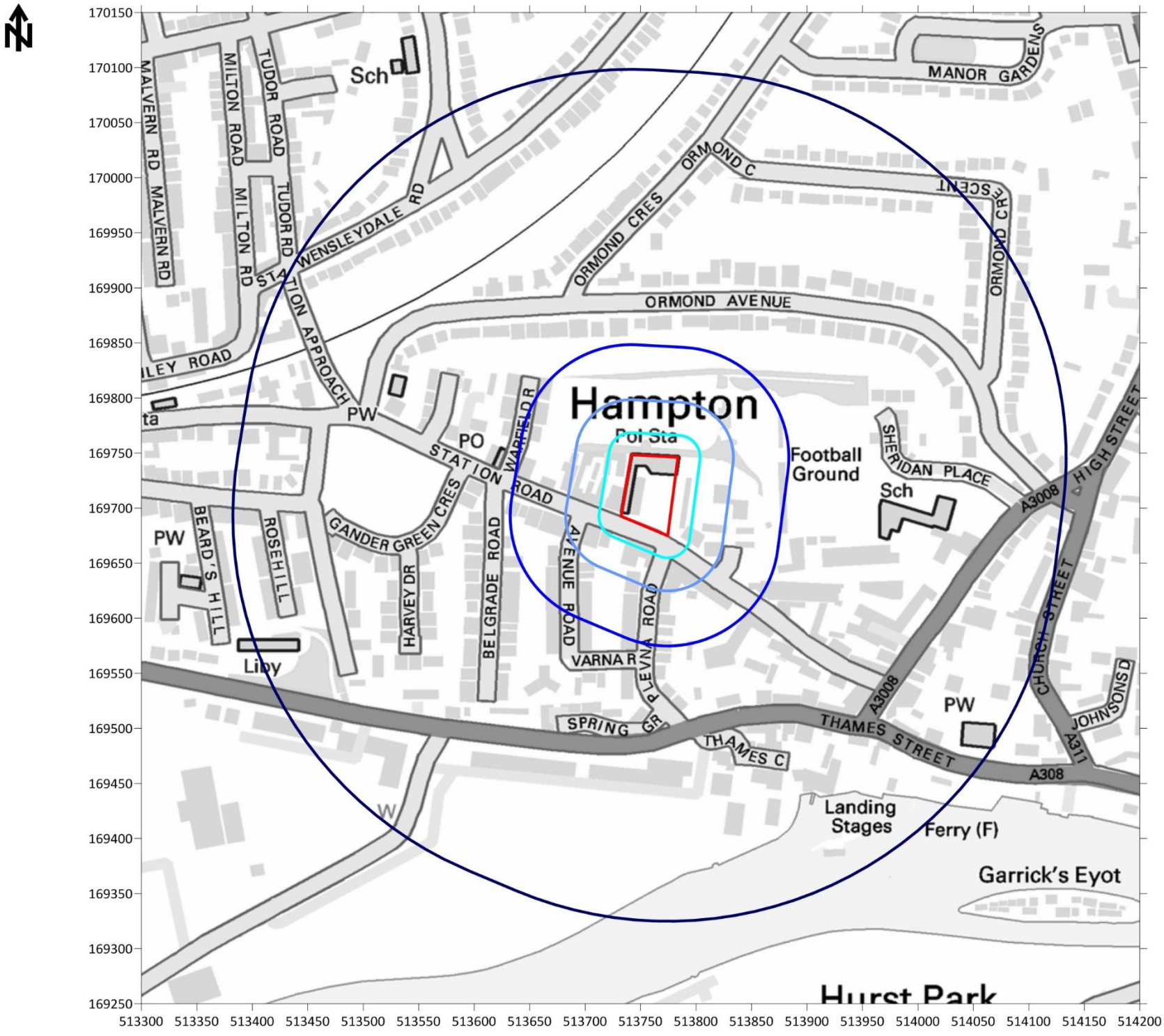

Legend

- Site Boundary
- 20m from Site Boundary
- 50m from Site Boundary
- 100m from Site Boundary
- 350m from Site Boundary

Title

Figure 1

Demolition, Earthworks and Construction Dust Buffer Zones

Project

Air Quality Assessment
Old Police Station, 66 Station Road
Hampton

Project Number

AQ107880

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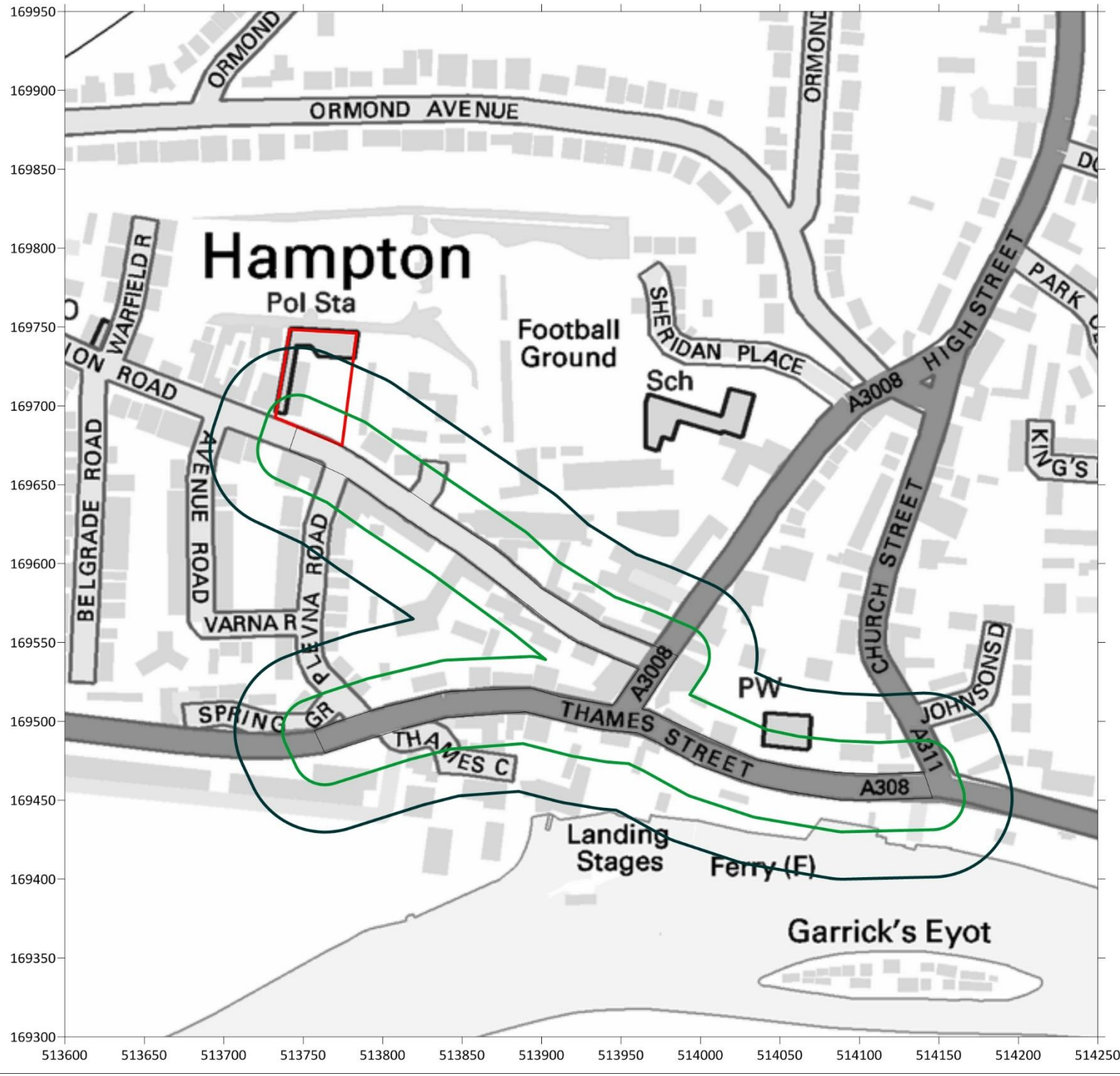

Legend

- Site Boundary
- 20m from Site Access Route
- 50m from Site Access Route

Title

Figure 4

Trackout Dust Buffer Zones

Project

Air Quality Assessment
Old Police Station, 66 Station Road
Hampton

Project Number

AQ107880

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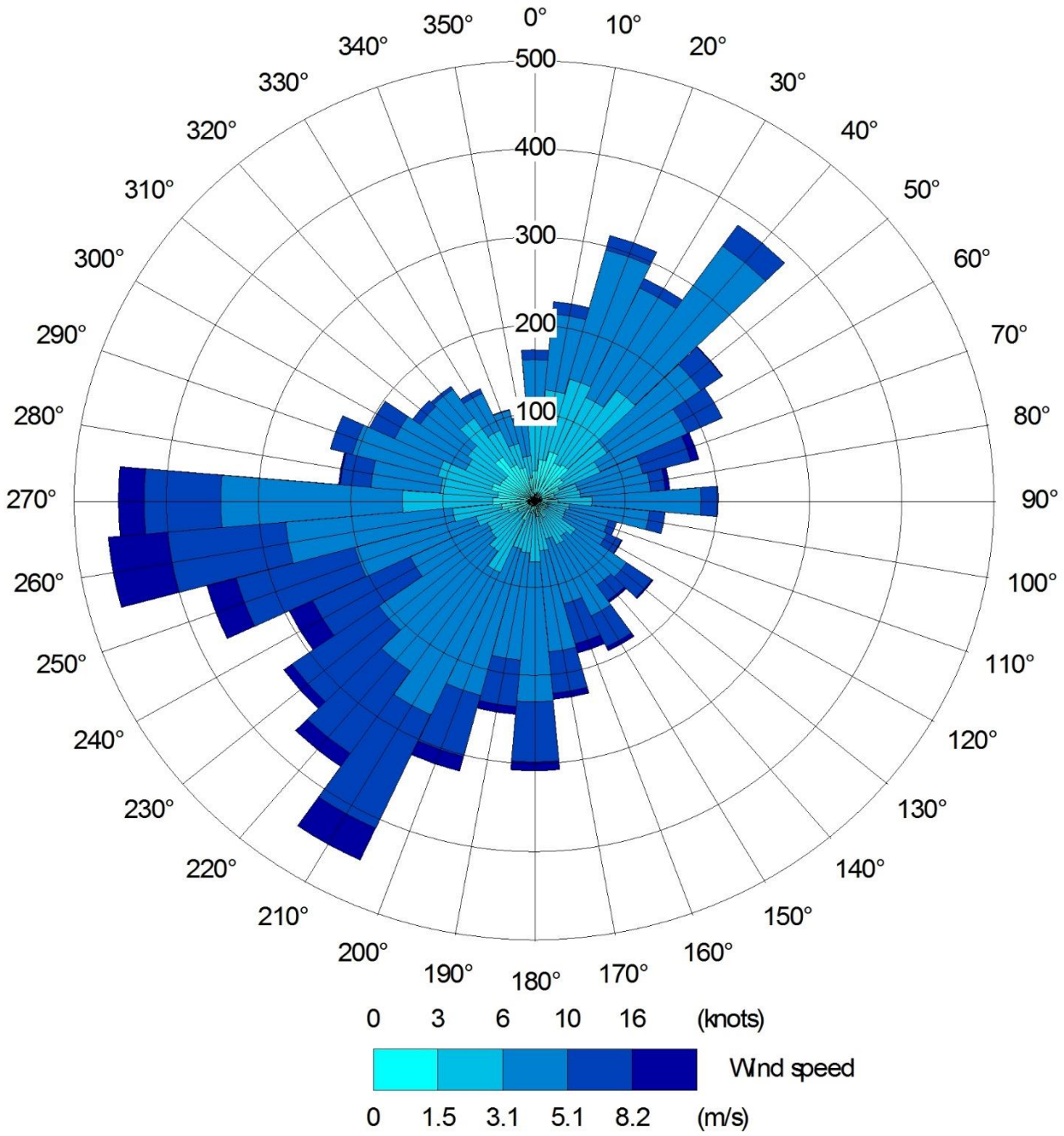

Title

Figure 5

Wind Rose Heathrow
Meteorological Station 2018

Project

Air Quality Assessment
Old Police Station, 66 Station Road
Hampton

Project Number

AQ107880

Client

Hampton Care Home Limited

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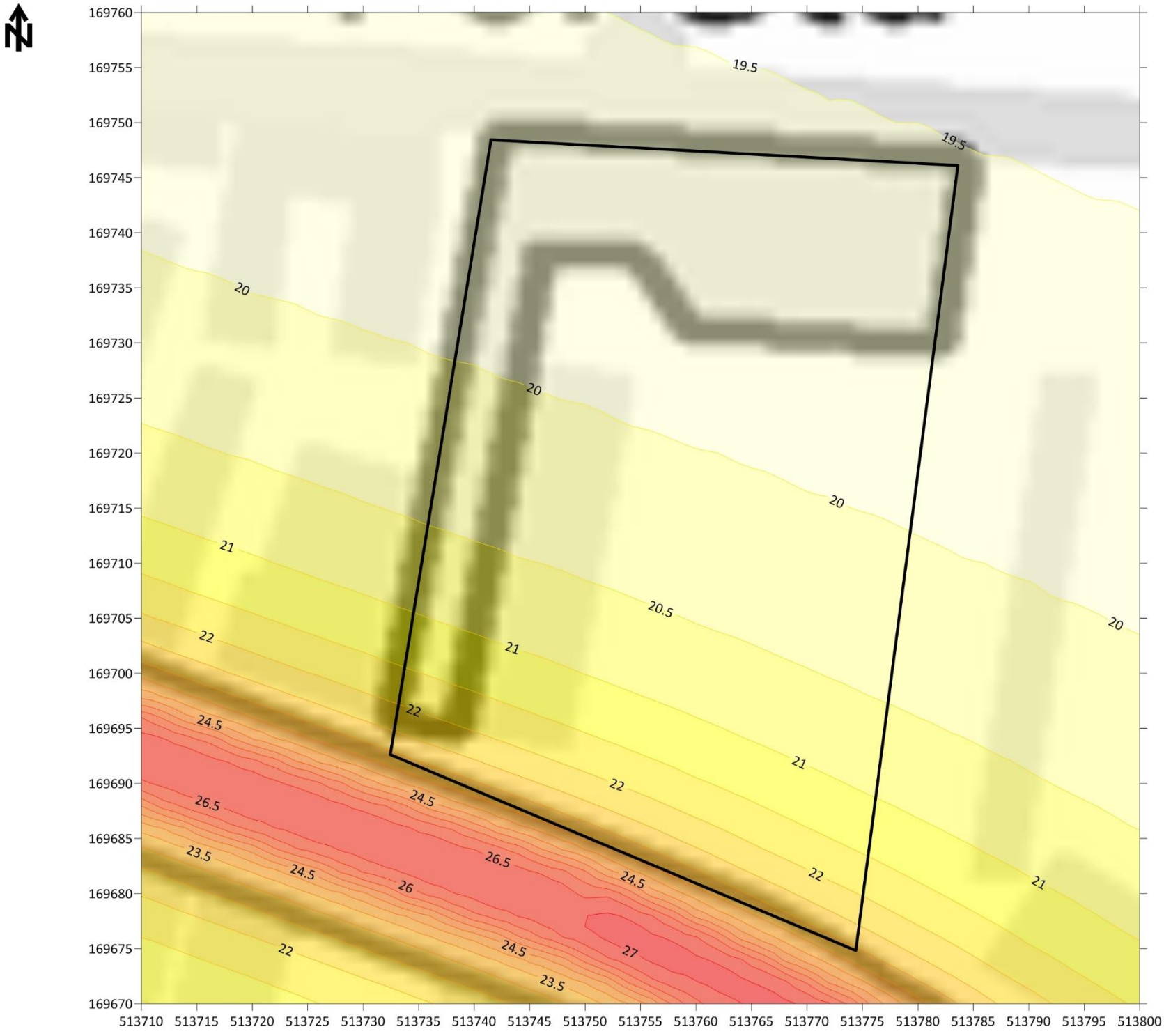
Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE

Tel – 0161 868 1300 Fax – 0161 868 1301
www.recltd.co.uk



Legend

Site Boundary

Predicted Annual Mean NO_2 Concentration (µg/m³)

27.0
26.5
26.0
25.5
25.0
24.5
24.0
23.5
23.0
22.5
22.0
21.5
21.0
20.5
20.0
19.5

Title

Figure 6

Predicted Annual Mean NO_2 Concentrations (µg/m³) 2021 DS

Project

Air Quality Assessment
Old Police Station, 66 Station Road
Hampton

Project Number

AQ107880

Client

Hampton Care Home Limited

REC
Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE
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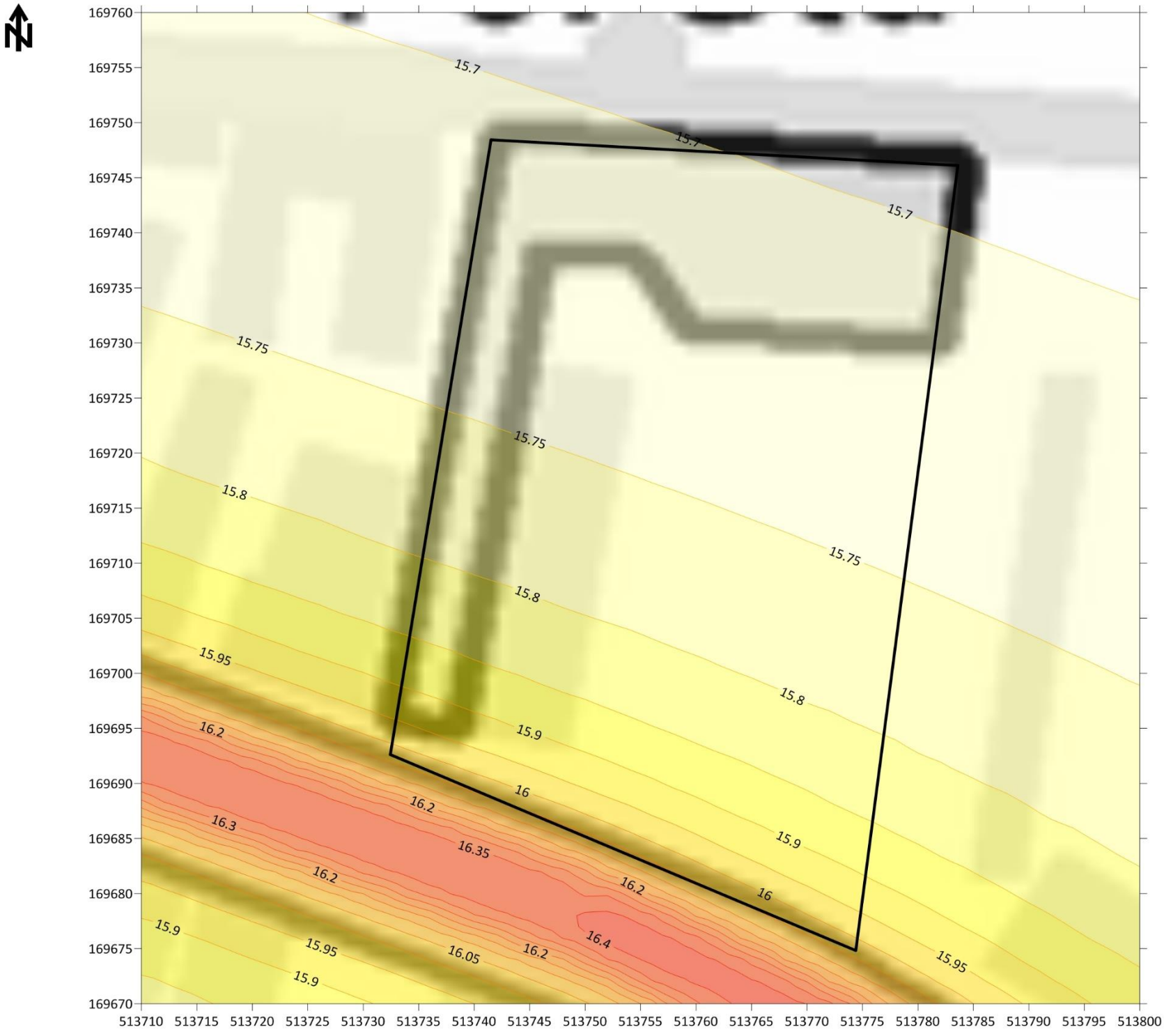

Legend

Site Boundary

16.5
16.4
16.4
16.3
16.3
16.3
16.2
16.1
16.1
16.1
16.0
15.9
15.9
15.8
15.8
15.8
15.7

Predicted Annual Mean PM_{10} Concentration (µg/m³)

Title

Figure 7

Predicted Annual Mean PM_{10} Concentrations (µg/m³) 2021 DS

Project

Air Quality Assessment
Old Police Station, 66 Station Road
Hampton

Project Number

AQ107880

Client

Hampton Care Home Limited

REC
Resource and Environmental Consultants Ltd
Osprey House, Broadway, Manchester M50 2UE
Tel – 0161 868 1300 Fax – 0161 868 1301
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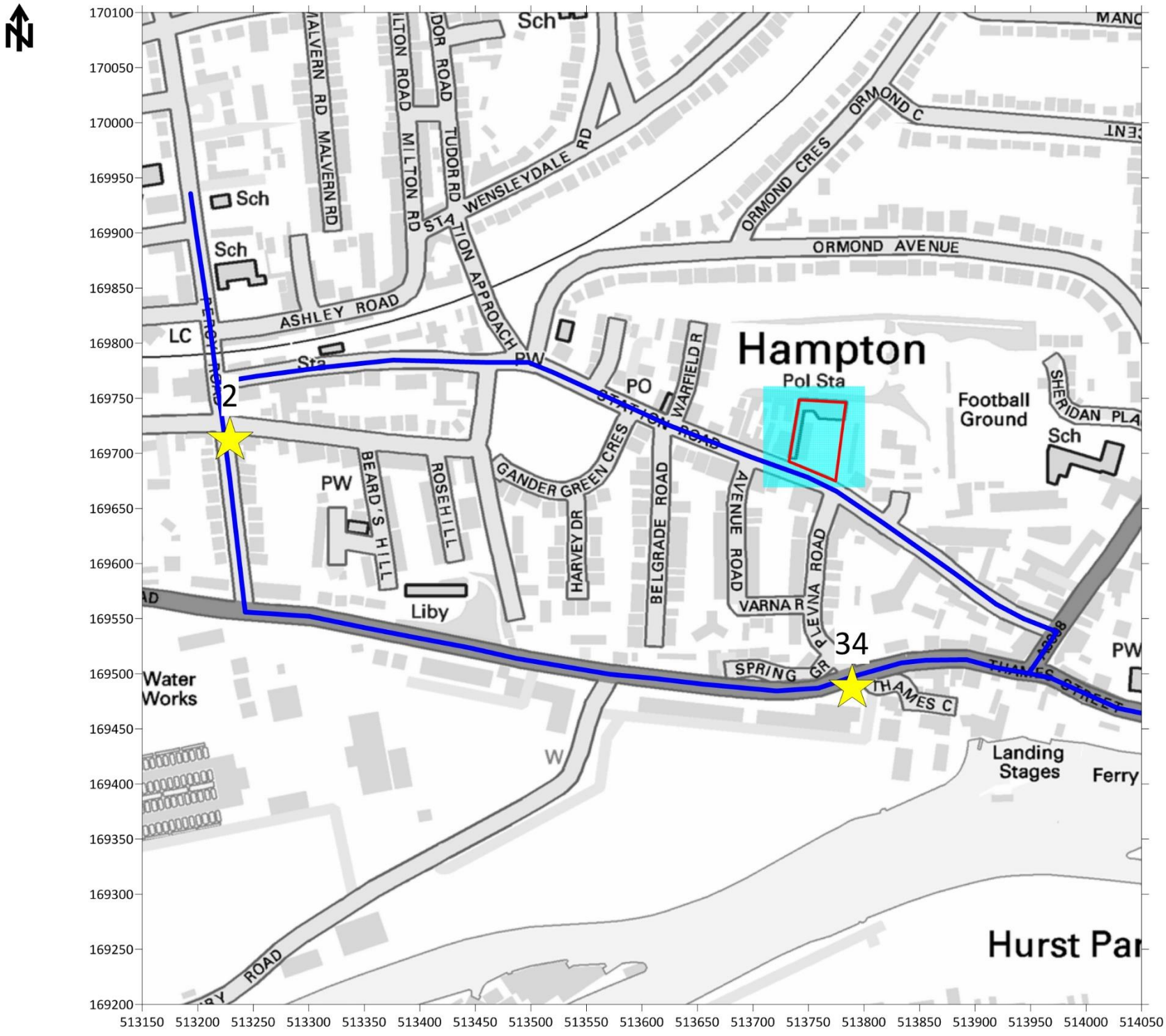

Legend

- Site Boundary
- Modelled Road Link
- Cartesian Grid
- Diffusion Tube Monitoring

Title

Figure 8

ADMS-Roads Input

Project

Air Quality Assessment
Old Police Station, 66 Station Road
Hampton

Project Number

AQ107880

Client

Hampton Care Home Limited

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APPENDIX II ASSESSMENT INPUT DATA

ASSESSMENT INPUTS

As the proposals are located within Richmond AQMA there is potential to expose future site users to elevated pollutant levels. Dispersion modelling utilising ADMS-Roads software was therefore undertaken to predict relevant NO_2, PM_{10} and $PM_{2.5}$ concentrations across the development site to assess site suitability for the proposed end-use.

The dispersion model requires input data that details the following parameters:

- Assessment area;
- Traffic and locomotive flow data;
- Vehicle and locomotive emission factors;
- Spatial co-ordinates of emissions;
- Street width;
- Meteorological data;
- Roughness length; and
- Monin-Obukhov length.

Assessment inputs are described in the following subsections.

Dispersion Model

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 4.0.1.0). 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.

Assessment Area

Ambient concentrations were predicted over the area NGR: 534250, 164400 to 534450, 164600 at a height of 1.5m to represent the ground floor level.

Results were subsequently used to produce contour plots within the Surfer software package.

Reference should be made to Figure 8 within Appendix I for a graphical representation of the assessment grid extents and ADMS-Road inputs for the operational year.

Traffic Flow Data

Traffic data for Station Road and Percy Road used in the assessment, including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition, was obtained from the London Atmospheric Emissions Inventory (LAEI). The updated version of the LAEI (2013) was released by the Greater London Authority (GLA) in 2016 and provides information on emissions from all sources of air pollutants in the Greater London area.

The remaining traffic data was obtained using the Department for Transport (DfT). The Dft Matrix web tool enables the user to view and download traffic flows on every link of the A-road and motorway network in Great Britain for the years 1999 to 2018. It should be noted that the DfT matrix is referenced in DEFRA guidance LAQM (TG16)[2] as being a suitable source of data for air quality assessments and is therefore considered to provide a reasonable representation of traffic flows in

the vicinity of the site
Growth factors provided by the Trip End Model Presentation Program (TEMPRO) software package were utilised to allow for conversion from the obtained 2013 traffic flow year to 2018, for model verification, and to 2021 which was used to represent the operational year of the proposed development.

Road widths were estimated from aerial photography and UK highway design standards. Reference should be made to Figure 6 within Appendix I for a graphical representation of the road link locations. Vehicle speeds were estimated based on the free flow potential of each link and local speed limits.

A summary of the traffic data used in the assessment is provided in Table AII.1 and Table AII.2.

Table AII.1 2018 Traffic Data

Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
L1	Station Road (East of Site)	7.5	5,161	7.2	25
L2	Station Road (East of Site) Slow Down	6.8	5,161	7.2	15
L3	Station Road (West of Site)	8.3	5,161	7.2	25
L4	Station Road (West of Site) Slow Down	8.0	5,161	7.2	15
L5	Percy Road	6.2	5,406	9.5	25
L6	Percy Road Slow Down	9.2	5,406	9.5	15
L7	Percy Road	6.3	5,406	9.5	25
L8	High Street	12.5	4,541	10.1	15
L9	Upper Sunbury Road	7.5	20,096	2.4	40
L10	Thames Street	7.2	20,096	2.4	40

The road width and mean vehicle speed shown in Table All.1 remained the same for the 2021 DS scenarios. A summary of the 2021 traffic data is shown in Table All.2.

Table AII.2 2021 Traffic Data

Road Link		DS	
		24-hour AADT Flow	HDV Prop. (%)
L1	Station Road (East of Site)	5,356	7.1
L2	Station Road (East of Site) Slow Down	5,356	7.1
L3	Station Road (West of Site)	5,356	7.1

Road Link		DS	
		24-hour AADT Flow	HDV Prop. (%)
L4	Station Road (West of Site) Slow Down	5,356	7.1
L5	Percy Road	5,725	9.5
L6	Percy Road Slow Down	5,725	9.5
L7	Percy Road	5,725	9.5
L8	High Street	3,716	11.3
L9	Upper Sunbury Road	20,651	2.6
L10	Thames Street	20,279	2.6

Emission Factors

Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 9.0) released in May 2019, which incorporates updated COPERT 5 vehicle emissions factors for NO_x and PM and EURO 6 vehicle fleet sub-categories.

There is current uncertainty over NO_2 concentrations within the UK, with roadside levels not reducing as previously expected due to the implementation of new vehicle emission standards. Therefore, 2018 emission factors have been utilised for the prediction of pollution levels for all scenarios in preference to the development opening year in order to provide a robust assessment.

Meteorological Data

Meteorological data used in this assessment was taken from Heathrow meteorological station over the period 1st January 2018 to 31st December 2018 (inclusive). Heathrow meteorological station is located at approximate NGR: 507060, 176500, which is approximately 9.5km northwest of the proposed development.

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 within Appendix I for a wind rose of utilised meteorological data.

Roughness Length

A roughness length (z_0) of 0.5m was used in this dispersion modelling study. This value of z_0 is considered appropriate for the morphology of the assessment area and the meteorological station location and is suggested within ADMS-Roads as being suitable for 'Parkland, open suburbia'.

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 30m was used in this dispersion modelling study. This value is considered appropriate for the morphology of the assessment area and the meteorological station location and is suggested as being suitable for 'mixed urban/ industrial'.

Background Concentrations

An annual mean NO_2 concentration of 18.58ug/m^3, and PM_{10} concentration of 15.60µg/m^3 predicted by DEFRA, was used in the dispersion modelling assessment to represent annual mean pollutant levels at the proposed development site.

Table AII.3 displays the specific background concentrations used for each diffusion tube assessed during the verification process. This data was used in to ensure an accurate and robust model.

Table AII.3 Predicted Diffusion Tube Monitoring Background Pollutant Concentrations

LBRuT Tubes	Pollutant	2018 Predicted Background Concentration (µg/m^3)
2, 34	NO_x	27.34
	NO_2	18.58

Similar to emission factors, background concentrations for 2018 were utilised in preference to the development opening year of 2021. This provided a robust assessment and is likely to overestimate actual pollutant concentrations during the operation of the proposals.

NO_x to NO_2 Conversion

Predicted annual mean NO_x concentrations from the dispersion model were converted to NO_2 concentrations using the spreadsheet provided by DEFRA, which is the method detailed within LLAQM.TG (16)[2].

Verification

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.

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.

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

LBRuT undertakes monitoring of NO_2 concentrations at two locations for verification purposes within the assessment extents. The road contribution to total NO_x concentration was calculated from the monitored NO_2 result for use in the verification process. This was undertaken following the methodology contained within IAQM and EPUK guidance LLAQM (TG16)[2].

One of the monitoring locations within the vicinity of the site was not suitable for verification

purposes. Monitoring location 2 is located opposite a Car showroom/garage, and loading bay. As such, due to the likely influencing factor of localised conditions which cannot be accurately replicated within the modelling input, this location was not considered for the verification process.

The dispersion model was run with the traffic input data previously detailed for 2018 to predict the NO_x concentration at the monitoring locations. The results are shown in Table AII.4.

Table AII.4 NO_x Verification Results

Site ID	Modelled Road NO_x Concentration ($\mu g/m^3$)	Monitored Road NO_x Concentration ($\mu g/m^3$)	Difference (%)
34	16.80	29.34	42.74

The monitored and modelled NO_x road contribution concentrations indicated that a verification factor of **1.7464** was required to be applied to all NO_x modelling results, showing the model has a tendency to underestimate pollutant concentrations throughout the assessment extents.

Table AII.5 presents the monitored annual mean NO_2 concentrations and the adjusted modelled total NO_2 concentration based on the above verification factor. Exceedances of the annual mean AQO for NO_2 are shown in **bold**.

Table AII.5 2018 NO_2 Monitoring Results

Site ID	Monitored NO_2 Concentration ($\mu g/m^3$)	Adjusted Modelled Total NO_2 Concentration ($\mu g/m^3$)	Difference (%)
34	32.00	32.00	0.00

As PM_{10}monitoring is not undertaken within the assessment extents, the verification adjustment factor of **1.7464** applied for NO_x was also used to adjust model predictions of PM_{10} in accordance with the guidance provided within LLAQM (TG16)[2].

APPENDIX III CONSTRUCTION PHASE ASSESSMENT CRITERIA

CONSTRUCTION PHASE METHODOLOGY

There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined within the Institute of Air Quality Management (IAQM) document 'Guidance on the Assessment of Dust from Demolition and Construction'[14].

Activities on the proposed construction site have been divided into four types to reflect their different potential impacts. These are:

- Demolition
- Earthworks;
- Construction; and
- Trackout.

The potential for dust emissions was assessed for each activity that is likely to take place and considered three separate dust effects:

- Annoyance due to dust soiling;
- Harm to ecological receptors; and
- The risk of health effects due to a significant increase in exposure to PM_{10} and $PM_{2.5}$.

The assessment steps are detailed below.

Step 1

Step 1 screens the requirement for a more detailed assessment. Should human receptors be identified within 350m from the site boundary or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should proceed to Step 2. Additionally, should ecological receptors be identified within 50m of the boundary site or 50m from the construction vehicle route up to 500m from the site entrance, then the assessment should also proceed to Step 2.

Should sensitive receptors not be present within the relevant distances then negligible impacts would be expected and further assessment is not necessary.

Step 2

Step 2 assesses the risk of potential dust impacts. A site is allocated to a risk category based on two factors:

- The scale and nature of the works, which determines the magnitude of dust arising as: small, medium or large (Step 2A); and
- The sensitivity of the area to dust impacts, which can be defined as low, medium or high sensitivity (Step 2B).

The two factors are combined in Step 2C to determine the risk of dust impacts without mitigation applied.

[14] Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management, 2016.

Step 2A defines the potential magnitude of dust emission through the construction phase. The relevant criteria are summarised in Table AIII.1.

Table AIII.1 Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	• Total building volume greater than 50,000m^3 • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities greater than 20m above ground level
	Earthworks	• Total site area greater than 10,000m^2 • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • More than 10 heavy earth moving vehicles active at any one time • Formation of bunds greater than 8m in height • More than 100,000 tonnes of material moved
	Construction	• Total building volume greater than 100,000m^3 • On site concrete batching • Sandblasting
	Trackout	• More than 50 Heavy Duty Vehicle (HDV) trips per day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length greater than 100m
Medium	Demolition	• Total building volume 20,000m^3 to 50,000m^3 • Potentially dusty construction material • Demolition activities 10m to 20m above ground level
	Earthworks	• Total site area 2,500m^2 to 10,000m^2 • Moderately dusty soil type (e.g. silt) • 5 to 10 heavy earth moving vehicles active at any one time • Formation of bunds 4m to 8m in height • Total material moved 20,000 tonnes to 100,000 tonnes
	Construction	• Total building volume 25,000m^3 to 100,000m^3 • Potentially dusty construction material (e.g. concrete) • On site concrete batching
	Trackout	• 10 to 50 HDV trips per day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50m to 100m
Small	Demolition	• Total building volume under 20,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities less than 10m above ground level • Demolition during wetter months

Magnitude	Activity	Criteria
	Earthworks	• Total site area less than 2,500m^2 • Soil type with large grain size (e.g. sand) • Less than 5 heavy earth moving vehicles active at any one time • Formation of bunds less than 4m in height • Total material moved less than 20,000 tonnes • Earthworks during wetter months
	Construction	• Total building volume less than 25,000m^3 • Construction material with low potential for dust release (e.g. metal cladding or timber)
	Trackout	• Less than 10 HDV trips per day • Surface material with low potential for dust release • Unpaved road length less than 50m

Step 2B defines the sensitivity of the area around the development site for construction, earthworks and trackout. The factors influencing the sensitivity of the area are shown in Table AIII.2.

Table AIII.2 Examples of Factors Defining Sensitivity of an Area

Sensitivity	Examples	
	Human Receptors	Ecological Receptors
High	• Users expect of high levels of amenity • High aesthetic or value property • People expected to be present continuously for extended periods of time • Locations where members of the public are exposed over a time period relevant to the AQO for PM_{10} e.g. residential properties, hospitals, schools and residential care homes	• Internationally or nationally designated site e.g. Special Area of Conservation
Medium	• Users would expect to enjoy a reasonable level of amenity • Aesthetics or value of their property could be diminished by soiling • People or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land e.g. parks and places of work	• Nationally designated site e.g. Sites of Special Scientific Interest

Sensitivity	Examples	
	Human Receptors	Ecological Receptors
Low	• Enjoyment of amenity would not reasonably be expected • Property would not be expected to be diminished in appearance • Transient exposure, where people would only be expected to be present for limited periods. e.g. public footpaths, playing fields, shopping streets, playing fields, farmland, footpaths, short term car park and roads	• Locally designated site e.g. Local Nature Reserve

The guidance also provides the following factors to consider when determining the sensitivity of an area to potential dust impacts during the construction phase:

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activity on nearby sites;
- Any pre-existing screening between the source and the receptors;
- Any conclusions drawn from analysing local meteorological data which accurately represent the area; and if relevant the season during which works will take place;
- Any conclusions drawn from local topography;
- Duration of the potential impact, as a receptor may become more sensitive over time; and
- Any known specific receptor sensitivities which go beyond the classifications given in the document.

These factors were considered in the undertaking of this assessment.

The sensitivity of the area to dust soiling effects on people and property is shown in Table AIII.3.

Table AIII.3 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the Source (m)			
		Less than 20	Less than 50	Less than 100	Less than 350
High	More than 100	High	High	Medium	Low
	10 - 100	High	Medium	Low	Low
	1 - 10	Medium	Low	Low	Low
Medium	More than 1	Medium	Low	Low	Low
Low	More than 1	Low	Low	Low	Low

Table AIII.4 outlines the sensitivity of the area to human health impacts.

Table AIII.4 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number of Receptors	Distance from the Source (m)				
			Less than 20	Less than 50	Less than 100	Less than 200	Less than 350
High	Greater than 32µg/m^3	More than 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32µg/m^3	More than 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28µg/m^3	More than 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	Less than 24µg/m^3	More than 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	Greater than 32µg/m^3	More than 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28 - 32µg/m^3	More than 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	24 - 28µg/m^3	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	Less than 24µg/m^3	More than 10	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Low	-	More than 1	Low	Low	Low	Low	Low

Table AIII.5 outlines the sensitivity of the area to ecological impacts.

Table AIII.5 Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	Less than 20	Less than 50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts. Table AIII.6 outlines the risk category from demolition activities

Table AIII.6 Dust Risk Category from Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Medium	Low	Negligible

Table AIII.7 outlines the risk category from earthworks and construction activities.

Table AIII.7 Dust Risk Category from Earthworks and Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

Table AIII.8 outlines the risk category from trackout.

Table AIII.8 Dust Risk Category from Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

Step 3

Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance to reduce potential dust impacts based upon the relevant risk categories identified in Step 2. For sites with **negligible** risk, mitigation measures beyond those required by legislation are not required. However, additional controls may be applied as part of good practice.

Step 4

Once the risk of dust impacts has been determined and the appropriate mitigation measures identified, the final step is to determine the significance of any residual impacts. For almost all construction activity, the aim should be to control effects through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

APPENDIX IV ASSESSOR'S CURRICULUM VITAE

CONAL KEARNEY

Head of Noise and Air

BEng(Hons), MSc, MIAQM, MIEnvSc

KEY EXPERIENCE:

Conal is a Principal Consultant with specialist experience in the air quality and odour sector. His key capabilities include:

- Advanced atmospheric air dispersion modelling of road vehicle and industrial emissions using ADMS-ROADS and AIRVIRO.
- Preparation of factual and interpretative Air Quality Assessment reports and Air Quality Environmental Statement chapters in the vicinity of proposed schemes and developments in accordance with DEFRA, Environment Agency and Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) methodologies.
- Management and delivery of project work on key, land development and urban regeneration projects.
- Assessment of road vehicle exhaust emissions using the Design Manual for Roads and Bridges (DMRB) calculation spreadsheet.
- Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- Dust and Odour impact assessments from minerals and waste sites
- Representing clients at public enquiries and planning hearings.

QUALIFICATIONS:

- Bachelor of Engineering
- Master of Science
- Member of Institute of Air Quality Management
- Member of the Institute of Environmental Science (IES)

SELECT PROJECTS SUMMARY:

Industrial Developments

Buck Park, Denholme - AQA and dust assessment for proposed mineral extraction and site restoration project.

Messingham Quarry, North Lincolnshire - AQA and dust impacts for proposed new sand extraction site.

Arden Quarry, Derbyshire - AQA for proposed mineral extraction and site restoration

Calder Brick Works, Yorkshire - AQA for proposed site restoration plan

Coopers Moss, St Helens AQA and dust assessment for materials import and site restoration.

Clayton Hall Landfill, Chorley - AQA and odour assessment for proposed landfill extension and mineral extraction.

Highways Developments

Alderley Edge Bypass, Cheshire - AQA for major new road scheme.

South Heywood – EIA for new link road and mixed use joint development

Residential Developments

Beck's Mill, Silsden – AQA and emissions calculation for proposed residential development

Bredbury Curve, Stockport - AQA assessment for proposed residential development in AQMA.

Hollin Lane, Middlewich – AQA for large scale residential development.

Friars School, Southwark, London.School development for mixed use education and residential building in AQMA.

Abbotsford House, Bearsden, Scotland – AQA and dust assessment for residential development

Kelvedon Street, Newport, South Wales – AQA for new housing development

Westcraig, Edinburgh - EIA for residential development

Public Sector

Technical advisor on Manchester Airport Consultative Committee - advise members on environmental technical matters in relation to the airport's operations.

Cheshire County Council - compile AQ chapters for Local Transport Plan

Cheshire East Council - specialist AQ advice on highways, minerals and waste projects

Local Air Quality Management

Broughton Gyratory, Chester - dispersion model for City Centre detailed assessment report

Congleton town centre - dispersion modelling assessment for detailed and further assessment reports.

Disley - dispersion modelling assessment for detailed and further assessments

Holmes Chapel - dispersion modelling assessment for detailed and further assessment reports for road and rail sources.

Crewe - town centre dispersion modelling for detailed and further assessment reports.

Commercial Developments

Granta Park Daycare Centre, Oxfordshire.AQA for new build daycare centre adjacent to major road.

Curzon Cinema, Colchester.Air quality assessment for town centre new build cinema.

Newfoundland Circus, Bristol - AQA for hotel development in city centre

Salesians School, **Chertsey** - AQA for school extension near M25

RACHAEL HARRISON

Graduate Air Quality Consultant

BSc (Hons).

KEY EXPERIENCE:

Rachael is a Graduate Environmental Consultant with specialist experience in the air quality sector. Her key capabilities include:

- Production of Air Quality Assessments to the Department for Environment, Food and Rural Affairs (DEFRA), Environment Agency and Environmental Protection UK (EPUK) methodologies for clients from the residential, retail and commercial sectors.
- Detailed dispersion modelling of road vehicle emissions using ADMS-Roads. Studies have included impact assessment of pollutant concentrations at various floor levels and assessment of suitability of development sites for proposed end-use.
- Assessment of road vehicle exhaust emissions using the Design Manual for Roads and Bridges (DMRB) calculation spreadsheet.
- Assessment of dust impacts from construction sites to the Institute of Air Quality Management (IAQM) methodology.
- Production of air quality mitigation strategies for developments throughout the UK.
- Defining baseline air quality conditions and identification of sensitive areas.

QUALIFICATIONS:

- Bachelor of Science

SELECT PROJECTS SUMMARY:

Environmental Impact Assessment:

Warburton Lane, Trafford – EIA for a large scale residential development of 473 dwellings

Residential Development:

Smithy Bridge Air Quality Assessment in support of a proposed development comprising of 200 residential dwellings in close proximity to the A58.Dispersion modelling of road vehicle exhaust emissions was completed using ADMS-Roads to consider site suitability for the proposed end-use. Pollutant concentrations were predicted to be above the air quality standards at sensitive locations across the site and as such mitigation measures were required and referenced. Subject to the inclusion of the relevant mitigation measures, air quality issues were not considered a constraint to planning consent

Minster Way, East Yorkshire AQA for a Large scale residential development comprising a two phase development of circa 400 residential units.

Hucknall, Nottinghamshire AQA

In support of a residential development of the site to provide 60 residential dwelling.

Vaughan Way, Leicester AQA in support of an extension to an existing building to provide 39 residential units across four additional floors.

Thame Park Road, Thame AQA in support of 175 residential dwellings with an additional 25 residential dwellings for a second phase.

Mixed Use Development:

Rotherhithe Street, Southwark - Air Quality Assessment in support of a proposed mixed use scheme mixed use development comprising of circa 7 residential units and one commercial unit. Concerns were raised as the site was located within the London Borough of Southwark AQMA. Subsequently, there were concerns the proposals would introduce future users to poor air quality. Dispersion modelling of road vehicle exhaust emissions was completed using ADMS-Roads to consider site suitability for the proposed end-use. Pollutant concentrations were predicted to be below the relevant AQO across the site, air quality was not considered to be a planning constraint

Commercial Development

132 Broughton Street, Manchester - AQA in support of a proposed Cash and carry Warehouse located in in the vicinity of Great Manchester AQMA.

Weston Hall Farm, Crewe AQA in support of the proposal comprising the change of use of current agricultural buildings to form a new commercial warehouses.

Holloway Road, Islington AQA in support of a two storey extension above the existing site to provide approximately 430m2 of additional floor space for office use Concerns were raised as the site was located within the London Borough of Islington AQMA

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