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THIRTEEN GROUP LIMITED

AIR QUALITY ASSESSMENT

AMBERLEY & HARROGATE STREET, HENDON, SUNDERLAND SR2 8ES

Client: Thirteen Group Limited

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APPENDICES

1 INTRODUCTION

1.1.1 By instruction from Thirteen Group Limited, NoiseAir Limited was commissioned to undertake an Air Quality Assessment (AQA) in support of a residential development at Amberley and Harrogate Street, Hendon, Sunderland, SR2 8ES (the 'Site'). The development comprises the construction of 103 dwellings (the 'Proposed Development') with associated parking and external amenity areas.

1.2 Site Location and Context

1.2.1 The Site is located off Amberley and Harrogate Street, Hendon, Sunderland, SR2 8ES, at approximate National Grid Reference (NGR): 440230, 556310. **Figure 1** details the site location. The Site is located in an area where air quality is mainly influenced by road traffic emissions along the local road network and as such, elevated pollutant concentrations may be experienced at this location. Subsequently, the development may lead to the exposure of future occupants to poor air quality, as well as adverse impacts at nearby sensitive receptors, as a result of fugitive dust emissions during construction and road vehicle exhaust emissions during operation. As such, an Air Quality Assessment is required to determine baseline conditions at the Site, consider its suitability for the proposed residential end-use and to assess potential impacts associated with the Proposed Development in accordance with the requirements of the National Planning Policy Framework (NPPF). The Air Quality Assessment will therefore consider ambient pollutant concentrations namely nitrogen dioxide (NO_2) and particulate matter (PM_{10}) across and in the vicinity of the Site.

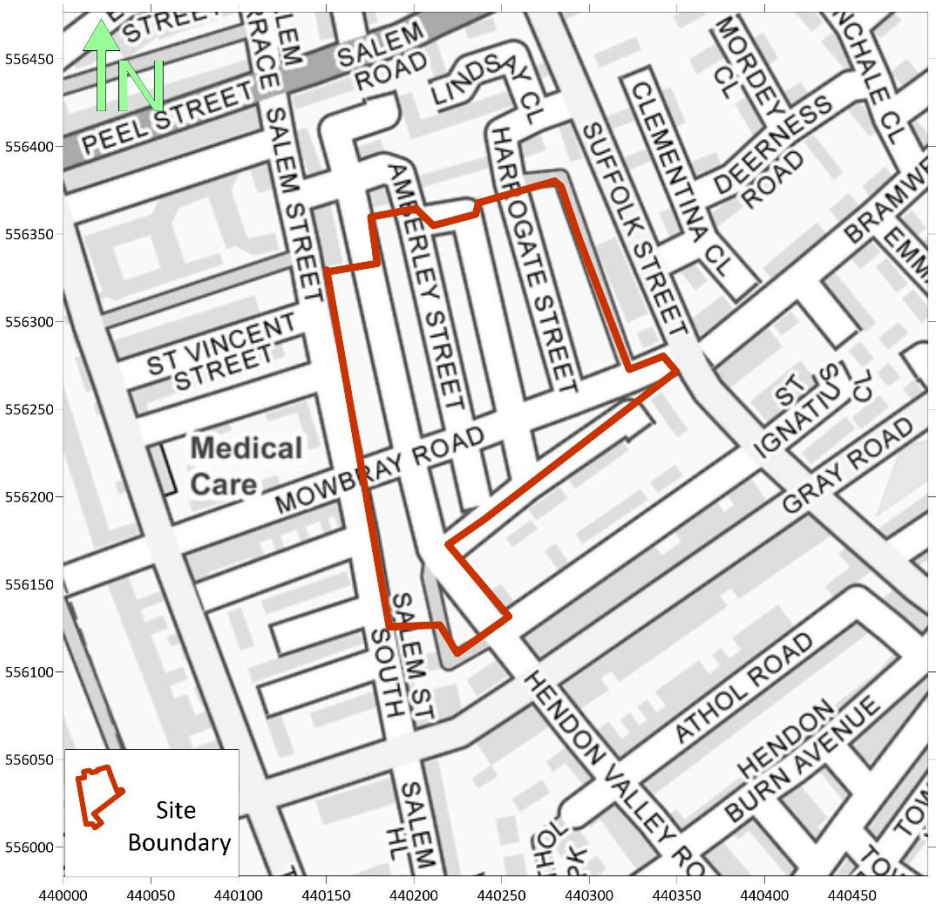

Figure 1: Site Location

1.2.2 The Site is currently an unoccupied greenfield site located approximately 620m to the southwest of Sunderland City Centre. The proposed Site layout is shown in **Figure 2**.

Figure 2: The Proposed site layout

1.2.3 The proposed development is located within the jurisdiction of Sunderland City Council (SCC). The development site is located within a predominantly residential area. Immediately to the east of the development site is Deerness Park Medical Centre, and to the west is Salem Street.

1.2.4 The main potential sources of air pollution were identified as emissions from road transport using the local road network. There are no combustion sources identified within the immediate vicinity of the Site that will influence the local air quality.

1.2.5 The report presents the findings of an assessment of the potential air quality impacts of the Proposed Development during both the construction and operational phases. For both phases, the type, source and significance of potential impacts are identified, and the measures that should be employed to minimise these described.

1.2.6 The standard limitations associated with this assessment are presented in **Appendix A**.

1.2.7 A glossary of terms used in this report is provided in **Appendix B**.

2 LEGISLATION AND POLICY

2.1 Air Quality Legislation and Policy

2.1.1 A summary of the relevant air quality legislation and policy is provided below.

UK Air Quality Strategy

2.1.2 The governments policy on air quality within the UK is set out in the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)[1]. The AQS provides a framework for reducing air pollution in the UK with the aim of meeting the requirements of European Union Legislation.

2.1.3 The AQS also sets standards and objectives for nine key aur pollutants to protect health, vegetation and ecosystems. These are benzene (C_6H_6), 1,3 butadiene (C_4H_6), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), ozone (O_3), and polycyclic aromatic hydrocarbons (PAHs).

2.1.4 The air quality standards are levels recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organization (WHO) with regards to current scientific knowledge and the effects of each pollutant on health and the environment.

2.1.5 The Air Quality Objectives (AQOs) are medium-term policy-based targets set by the Government, which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to EPAQS recommended standards or WHO guideline limits, whereas other involve a margin of tolerance, i.e. a limited number of permitted exceedances of standards over a given period.

2.1.6 **Table 1** presents the relevant UK AQOs for pollutants considered within this assessment.

Table 1: National Air Quality Objectives and European Directive Limit Values for the Protection of Human Health

Pollutant	Applies to	Objective	Measured As
NO_2	UK	40µg/m^3	Annual mean
	UK	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean

[1] Department for Environment, Food and Rural Affairs (Defra) and the Devolved Administrations (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volumes 1 and 2).

Table 1: National Air Quality Objectives and European Directive Limit Values for the Protection of Human Health			
PM_{10}	UK (except Scotland)	40µg/m^3	Annual mean
	UK (except Scotland)	50µg/m^3 not to be exceeded more than 35 times a year	24-hour mean

2.1.7 For the pollutants considered in this assessment, there are both long-term (annual mean) and short-term standards. In the case of NO_2, the short-term standard is for a 1-hour averaging period, whereas for PM_{10} it is a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants, for example temporary exposure on the pavement adjacent to a busy road compared with the exposure of residential properties adjacent to a road.

Air Quality Regulations (2016)

2.1.8 Many of the objectives in the AQS have been made statutory in England with the Air Quality (England) Regulations 2000[2] and the Air Quality (England) (Amendment) Regulations 2002[3] for the purpose of Local Air Quality Management (LAQM).

2.1.9 These Regulations require that likely exceedances of the AQS objectives are assessed in relation to:

> *[…] the quality of air at locations which are situated outside of buildings or other natural or man-made structures, above or below ground, and where members of the public are regularly present […]'*

2.1.10 The Air Quality Standards (Amendment) Regulations 2016[4] amends the Air Quality Standards Regulations 2010 that transpose the European Union Ambient Air Quality Directive (2008/50/EC) into law in England. This Directive sets legally binding limit values for concentrations in outdoor air of major air pollutants that impact public health such as PM_{10}, $PM_{2.5}$ and NO_2. The limit values for NO_2 and PM_{10} are the same concentration levels as the relevant AQS objectives and the limit value for $PM_{2.5}$ is a concentration of 25µg/m^3.

[2] The Air Quality (England) Regulations 2000 – Statutory Instrument 2000 No.928.
[3] The Air Quality (England) (Amendment) Regulations 2002 – Statutory Instrument 2002 No.3043.
[4] The Air Quality Standards (Amendment) Regulations 2016 - Statutory Instrument 2016 No. 1184.

Environmental Protection Act 1990 – Control of Dust and Particles Associated with Construction

2.1.11 Section 79 of the Environmental Protection Act 1990[5] gives the following definitions of statutory nuisance relevant to dust and particles:

> 'Any dust, steam, smell or other effluvia arising from industrial, trade or business premises or smoke, fumes or gases emitted from premises so as to be prejudicial to health or a nuisance'; and
>
> 'Any accumulation or deposit which is prejudicial to health or a nuisance'.

2.1.12 Following this, Section 80 says that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

2.1.13 There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist. Nuisance is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred.

Environment Act 1995

2.1.14 Under Part IV of the Environment Act 1995[6], local authorities must review and document local air quality within their area by way of staged appraisals and respond accordingly, with the aim of meeting the air quality objectives defined in the Regulations. Where the objectives are not likely to be achieved, an authority is required to designate an Air Quality Management Area (AQMA). For each AQMA the local authority is required to draw up an Air Quality Action Plan (AQAP) to secure improvements in air quality and show how it intends to work towards achieving air quality standards in the future.

Clean Air Strategy (2019)

2.1.15 In 2019, the UK government released its Clean Air Strategy 2019[7], part of its 25 Year Environment Plan[8]. The Strategy sets out the comprehensive action that is considered to be required from across all parts of government and society.

[5] Environmental Protection Act. London 1990. HMSO
[6] Environment Act 1995. London HMSO
[7] Department for Environment, Food and Rural Affairs (2019) Clean Air Strategy 2019.
[8] Department for Environment Food and Rural Affairs (Defra) (2018) A Green Future: Our 25 Year Plan to Improve the Environment.

2.1.16 The primary focus of air quality management has primarily related to NO_2, and its principal source in the UK, road traffic. The 2019 Strategy aims to broaden the focus to other areas, including actions on clean growth, and emissions from domestic wood burning stoves, industry and agriculture.

2.2 Planning Policy

2.2.1 A summary of the national and local planning policy relevant to the Proposed Development and air quality is provided below.

National Planning Policy Framework (2019)

2.2.2 The Government's overall planning policies for England are described in the National Planning Policy Framework[9]. The core underpinning principle of the Framework is the presumption in favour of sustainable development, defined as:

> '[…] meeting the needs of the present without compromising the ability of future generations to meet their own needs.'

2.2.3 One of the three overarching objectives of the NPPF is that planning should 'contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'

2.2.4 In relation to air quality, the following paragraphs in the document are relevant:

- Paragraph 54, which states 'Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition.';
- Paragraph 103, which states 'Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health.';
- Paragraph 170, which states 'Planning policies and decisions should contribute to and enhance the natural and local environment by: […] e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution

[9] Ministry of Housing, Communities & Local Government (2019) National Planning Policy Framework

or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.';

- Paragraph 180, which states 'Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.';
- Paragraph 181, which states 'Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.'; and
- Paragraph 183, which states 'The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities'.

Sunderland Core Strategy Development Plan

2.2.5 The Core Strategy Development Plan Document (DPD)[10] was adopted in January 2020 which sets out the long-term vision and objectives for Sunderland. This plan sets out strategy, strategic policies and strategic allocations and designations to manage future development in the city for the period from 2015 to 2033.

2.2.6 A review of the Sunderland Local Plan[10] identified the following policy of relevance to the assessment:

[10] Sunderland City Council - Core Strategy and Development Plan 2015-2033. January 2020.

*"**Policy HS1 Quality of life and amenity***

1. Development must demonstrate that it does not result in unacceptable adverse impacts which cannot be addressed through appropriate mitigation, arising from the following sources:

i. air quality;
ii. noise;
iii. dust;
iv. vibration;
v. odour;
vi. emissions;
vii. land contamination and instability;
viii. illumination;
ix. run-off to protected waters; or
x. traffic;

2. development must ensure that the cumulative impact would not result in unacceptable adverse impacts on the local community; and

3. development will not normally be supported where the existing neighbouring uses would unacceptably impact on the amenity of future occupants of the proposed development."

2.2.7 The above policy relating to air quality has been considered within the assessment.

2.3 Guidance

2.3.1 A summary of the publications referred to in undertaking this assessment is provided below.

Local Air Quality Management Review and Assessment Technical Guidance (2018)

2.3.2 The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their review and assessment work[11]. This guidance, referred to in this document as LAQM.TG16, has been used where appropriate in the assessment presented herein.

[11] Department for Environment, Food and Rural Affairs (Defra) (2018) Part IV The Environment Act 1995 and Environment (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance LAQM.TG16.

Land-Use Planning & Development Control: Planning for Air Quality (2017)

2.3.3 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have published guidance[12] that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and, the possible mitigation measures that may be implemented to minimise these impacts.

Guidance on the Assessment of Dust from Demolition and Construction (2016)

2.3.4 This document[13] published by the IAQM was produced to provide guidance to developers, consultants and environmental health officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM_{10} impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

National Planning Practice Guidance – Air Quality (2019)

2.3.5 This guidance[14] provides a number of guiding principles on how the planning process can take into account the impact of new development on air quality, it explains how much detail air quality assessments need to include for proposed developments, and how impacts on air quality can be mitigated. It also provides information on how air quality is taken into account by local authorities in both the wider planning context of Local Plans and neighbourhood planning, and in individual cases where air quality is a consideration in a planning decision.

[12] Environmental Protection UK and Institute of Air Quality Management (Version 1.2 Updated January 2017) Land Use Planning & Development Control: Planning for Air Quality.
[13] Institute of Air Quality Management (Version 1.1 Updated June 2016) Guidance on the Assessment of Dust from Demolition and Construction.
[14] Department of Communities and Local Government (DCLG) (Updated November 2019) National Planning Practice Guidance.

3 SCOPE AND CONSULTATION

3.1 Scope

3.1.1 The scope of the assessment has been determined in the following way:

- Review of SCC's latest available Air Quality Annual Status Report (ASR)[15]and air quality data from the area surrounding the Site, including data from SCC, Defra[16] and the Environment Agency[17];
- Desk study to confirm the locations of nearby existing receptors that may be sensitive to changes in local air quality, and a review of the masterplan for the Proposed Development to establish the location of new sensitive receptors; and
- Review of the traffic data provided by the Project Transport Consultant.

3.1.2 The scope of the assessment includes consideration of the potential impacts on local air quality from:

- Dust and fine particulate matter during the construction phase;
- Increases in pollutant concentrations as a result of exhaust emissions arising from construction and plant;
- Increases in pollutant concentrations as a result of exhaust emissions arising from traffic generated by the Proposed Development once operational; and
- Exposure of future occupants to poor air quality should elevated pollution levels be experienced on Site.

3.2 Consultation

3.2.1 The adopted methodology was agreed with Joanne Dodson, Senior Environmental Health Officer at SCC, on 30th March 2022.

[15] Sunderland City Council-2020 Air Quality Annual Status Report (ASR), June 2020.
[16] Department for Environment, Food and Rural Affairs (Defra) Local Air Quality Management (LAQM) Support Pages. [Online] Available at: http://laqm.defra.gov.uk/ [Accessed on 26/04/2022].
[17] Department for Environment, Food and Rural Affairs (Defra) (2020) Pollution Inventory [Online] Available at: https://data.gov.uk/dataset/cfd94301-a2f2-48a2-9915-e477ca6d8b7e/pollution-inventory [Accessed on 26/04/2022]

4 METHODOLOGY

4.1 Introduction

4.1.1 The proposed development has the potential to cause air quality impacts during the construction and operational phase, as well as expose future residents to elevated pollution levels. These issues have been assessed in accordance with the following methodology.

4.2 Construction Phase Assessment

4.2.1 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 IAQM guidance.

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

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

4.2.3 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}.

4.2.4 The assessment steps are detailed below.

Step 1

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

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

Step 2

4.2.7 Step 2 assesses the risk of potential dust impacts. A site is allocated 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).

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

4.2.9 Step 2A defines the potential magnitude of dust emission throughout the construction phase. The relevant criteria are summarised in **Table 2.**

Table 2: Construction Dust - Magnitude of Emission

Magnitude	Activity	Criteria
Large	Demolition	Total volume of building to be demolished greater than 50,000 m^3. Potentially dusty material (e.g., concrete). On-site crushing and screening. Demolition activities more than 20m about 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 100,000 m^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 10 0m.
Medium	Demolition	Total volume of building to be demolished between 20,000 m^3 and 50,000 m^3. Potentially dusty construction material. Demolition activities 10m to 20m above ground level.
	Earthworks	Total site area 2,500m^2 to 10,000 m^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).

Table 2: Construction Dust - Magnitude of Emission		
Magnitude	**Activity**	**Criteria**
		Unpaved road length 50m to 100 m.
Small	Demolition	Total volume of building to be demolished less than 20,000 m^3. Construction material with low potential for dust release (e.g., metal cladding or timber). Demolition activities less than 10m above ground and during wetter months.
	Earthworks	Total site area less than 2,500 m^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 25,000 m^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 50 m.

4.2.10 Step 2B defines the sensitivity of the area around the development to potential dust impacts. The influencing factors are shown in **Table 3**.

Table 3: Examples of Factors Defining Sensitivity of an Area		
Receptor Sensitivity	**Examples**	
	Human Receptors	**Ecological Receptors**
High	Users expect 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.

Table 3: Examples of Factors Defining Sensitivity of an Area		
Receptor 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, shopping streets, playing fields, farmland, short term car parks and roads.	Locally designated site e.g., Local Nature Reserve.

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

- Any history of dust generating activities in the area;
- The likelihood of concurrent dust generating activities on nearby sites;
- Any pre-existing screening between the source and 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.

4.2.12 These factors were considered in the undertaking of this assessment.

4.2.13 The criteria for determining the sensitivity of the area to dust soiling effects on people and property is summarised in **Table 4**.

Table 4: Construction Dust - 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

Table 4: Construction Dust - 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**
Low	More than 1	Low	Low	Low	Low

4.2.14 **Table 5** outlines the criteria for determining the sensitivity of the area to human health impacts.

Table 5: Construction Dust - Sensitivity of the Area to Human Health Effects						
Receptor Sensitivity	**Background Annual Mean PM_{10} Conc.**	**Number of Receptors**	**Distance from the Source (m)**			
			Less than 20	**Less than 50**	**Less than 100**	**Less than 350**
High	Greater than 32 µg/m^3	More than 1	High	High	High	Medium
		10 - 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 – 32 µg/m^3	More than 100	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	Less than 24 µg/m^3	More than 100	Medium	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Medium	Greater than 32 µg/m^3	More than 100	High	Medium	Low	Low
		10 - 100	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 – 32 µg/m^3	More than 100	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	Less than 24 µg/m^3	More than 100	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	More than 1	High	Medium	Low	Low

4.2.15 **Table 6** outlines the criteria for determining the sensitivity of the area to ecological impacts.

Table 6: Construction Dust - 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

4.2.16 Step 2C combines the dust emission magnitude with the sensitivity of the area to determine the risk of unmitigated impacts.

4.2.17 **Table 7** outlines the risk category from demolition activities.

Table 7: Dust Risk Category from Demolition Activities			
Receptor Sensitivity	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
High	High	Medium	Medium
Medium	High	Medium	Low
Low	Low	Low	Negligible

4.2.18 **Table 8** outlines the risk category from earthworks and construction activities.

Table 8: Dust Risk Category from Earthworks and Construction Activities			
Receptor Sensitivity	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
High	High	Medium	Low
Medium	Medium	Medium	Low
Low	Low	Low	Negligible

4.2.19 **Table 9** outlines the risk category from trackout activities.

Table 9: Dust Risk Category from Trackout Activities			
Receptor Sensitivity	**Dust Emission Magnitude**		
	Large	**Medium**	**Small**
High	High	Medium	Low
Medium	Medium	Low	Negligible
Low	Low	Low	Negligible

Step 3

4.2.20 Step 3 requires the identification of site-specific mitigation measures within the IAQM guidance18 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

4.2.21 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 impact will normally be **not significant**.

4.3 Operational Phase Assessment

4.3.1 The development has the potential to expose future residents to any existing air quality issues.

4.3.2 A screening assessment was therefore undertaken using information provided by the Transport Consultant and by the criteria contained within the Environmental Protection UK EPUK and IAQM guidance documents to determine the potential for trips generated by the development to affect local air quality.

4.3.3 The EPUK and IAQM guidance 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; and
- 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;

[18] Guidance on the Assessment of Dust from Demolition and Construction V1.1, IAQM, 2016.

- 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;
- Proposals which include either a centralised plant using biofuel, a combustion plant with single or thermal input >300KWh or a standby emergency generator associated with a centralised energy centre; and
- Proposals which include combustion processes of any size.

4.3.4 Should these criteria not be met, then the EPUK and IAQM guidance documents consider air quality impacts associated with a scheme to be **not significant** and no further assessment is required.

4.3.5 Should screening of the traffic data indicate that any of the above criteria are met, then potential impacts at sensitive receptor locations can be assessed by calculating the predicted change in pollutant concentrations as a result of the proposed development.

4.3.6 The significance of predicted impacts can then be determined in accordance with the methodology outlined in the EPUK and IAQM guidance.

5 BASELINE

5.1 Introduction

5.1.1 Existing air quality conditions in the vicinity of the site were assessed in order to provide a baseline for assessment. These are detailed in the following Sections.

5.2 Local Air Quality Management

5.2.1 As required by the Environment Act (1995), SCC has undertaken Review and Assessment of air quality within their area of jurisdiction.

5.2.2 According to the recent Annual Status Report (ASR)[19], annual mean concentrations of NO_2 are below the AQO within the city. As such, no AQMA has been declared.

5.3 Air Quality Monitoring

5.3.1 Monitoring of pollutant concentrations is undertaken by SCC throughout their area of jurisdiction. According to the recent ASR, in 2019 SCC undertook automatic and non-automatic monitoring of NO_2 at 5 and 33 sites respectively.

5.3.2 Recent NO_2 result recorded by automatic monitoring stations in the vicinity of the development have shown in **Table 10**.

Table 10: Automatic monitoring Results – NO_2

Monitoring Site		Site Type	Distance from the site (m)	Monitored NO_2 Concentration ($\mu g/m^3$)		
ID	Name			2017	2018	2019
CM1	Trimdon Street	Kerbside	1,547	30	32	28

5.3.3 Recent NO_2 results recorded by non-automatic monitoring stations in the vicinity of the development have shown in **Table 11**.

[19] Sunderland City Council ASR 2020, June 2020.

Table 11: non-automatic monitoring Results – NO_2						
Monitoring Site		Site Type	Distance from the site (m)	Monitored NO_2 Concentration ($\mu g/m^3$)		
ID	Name			2017	2018	2019
53	166 Chester Road	Roadside	1,677	25.90	25.30	25.60
55	25 Eden Vale	Roadside	1,545	31.00	25.80	25.10
57	5/6 Nbridge Street	Kerbside	1,622	26.90	27.10	32.20
88	Hind Street	Kerbside	1,268	-	26.40	28.20
94	Chaplin's PH	Kerbside	910	29.90	31.80	27.80
103	Air Quality Trailer, Trimdon Street	Kerbside	1,548	36.80	33.10	38.00
119	4 Athaneum Street	Roadside	751	23.00	23.70	23.00
120	Gillespies	Roadside	864	27.00	23.00	23.60
121	16 Windsor Terrace	Roadside	1,655	23.10	21.80	23.80
128	Echo Building	Roadside	1,131	29.90	22.30	26.10
129	West Sunniside	Roadside	833	19.60	19.40	18.10
130	St Mary's Car Park	Roadside	1,201	23.30	25.00	22.10

5.3.4 As shown in **Table 11** annual mean NO_2 concentrations were below the AQO of 40 $\mu g/m^3$ at all monitoring stations near the site in recent years.

5.3.5 **Figure 3** details the monitoring locations.

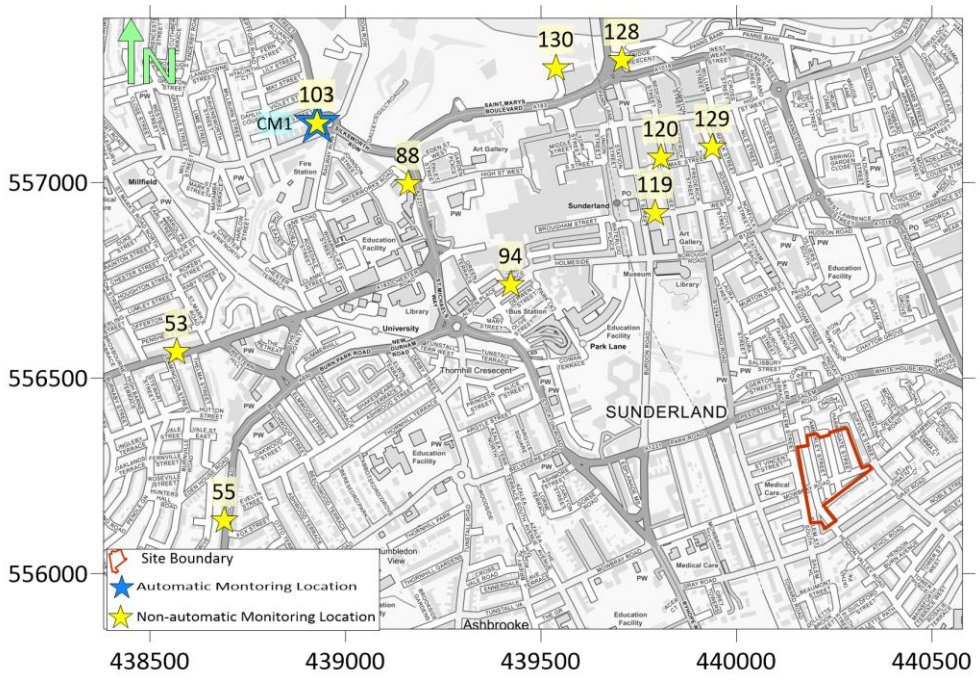

Figure 3: Monitoring Locations

5.4 Background Pollutant Concentrations

5.4.1 Predictions of background pollutant concentrations on a 1 km-by-1 km 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 site is located in grid square 440500, 556500. Data for this location was downloaded from the DEFRA website[20] and is summarised **Table 12**.

Table 12: Background Pollutant Concentrations

Pollutant	Predicted Background Pollutant Concentration (µg/m^3)		
	2019	2021	2024
NO_2	14.3	13.0	11.5
PM_{10}	10.4	10.0	9.7
Rounded to 1d.p.			

5.4.2 As shown in **Table 12**, predicted background NO_2 and PM_{10} concentrations are well below the relevant AQOs at the site. This indicates that in future years air quality within these grids will likely improve and are unlikely to give rise to exhaustive emission levels above the limit value of 40ug/m^3.

[20] https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018.

6 ASSESSMENT

6.1 Introduction

6.1.1 There is the potential for air quality impacts as a result of fugitive dust emissions during construction and exhaust emissions from vehicles travelling to and from the site during operation. These are assessed in the following Sections.

6.2 Construction Phase

6.2.1 The undertaking of activities such as demolition, excavation, groundworks, 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 roads and highway surfaces.

6.2.2 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

6.2.3 Receptors sensitive to potential dust impacts during demolition, earthworks and construction were identified from a desk-top study of the area up to 350 m from the development boundary as illustrated in **Figure 4** and are summarised in **Table 13.**

Table 13: Demolition, Earthworks and Construction Dust Sensitive Receptors

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

6.2.4 Receptors sensitive to potential dust impacts from trackout were identified from a desk-top study of the area for up to 50m from the road network and within 500m of the site access. These are summarised in **Table 14.**

Table 14: Trackout Dust Sensitive Receptors

Distance from Site Access Route (m)	Approximate Number of Human Receptors	Approximate Number of Ecological Receptors
Up to 20	More than 100	-

Table 14: Trackout Dust Sensitive Receptors		
Distance from Site Access Route (m)	**Approximate Number of Human Receptors**	**Approximate Number of Ecological Receptors**
Up to 50	More than 100	-

6.2.5 There are no ecological receptors within 50 m of the development boundary or access route, or within 500m of the site entrance as identified using Multi Agency Geographic Information for the Countryside (MAGIC) website[21].

6.2.6 **Figure 4** illustrates the buffer zones for construction phase activities.

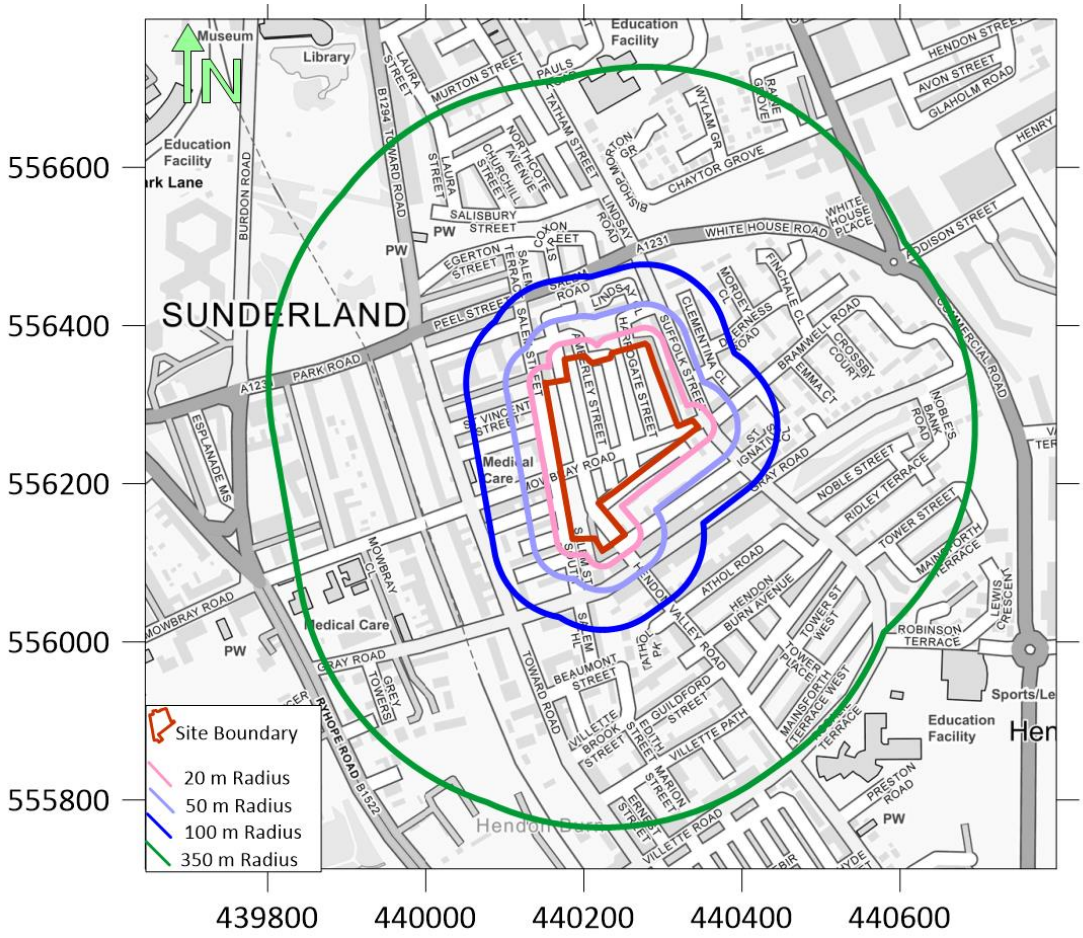

Figure 4 Illustrates Construction Buffer Zones.

6.2.7 A number of additional factors have been considered when determining the sensitivity of the surrounding area. These are summarised in **Table 15.**

[21] Magic Map Application (defra.gov.uk)

Table 15: Additional Area Sensitivity Factors to Potential Dust Impacts	
Guidance	**Comment**
Whether there is any history of dust generating activities in the area.	The desk top study indicates no dust generating activities in the local area.
The likelihood of concurrent dust generating activity on nearby sites.	A review of the planning portal did not indicate any major development proposals likely to result in concurrent dust generation in the vicinity of the site.
Pre-existing screening between the source and the receptors.	There is no significant screening around the site boundary.
Conclusions drawn from analysing local meteorological data which accurately represent the area: and if relevant the season during which works will take place.	The predominant wind bearing at the site is from the west as shown in **Figure 5**. As such, receptors to the east of the boundary are most likely to be affected by dust releases.
Conclusions drawn from local topography.	There is no topographical constraint 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, it is possible that it will extend over two years.
Any known specific receptor sensitivities which go beyond the classifications given in the document.	No specific receptor sensitivities identified during the baseline assessment.

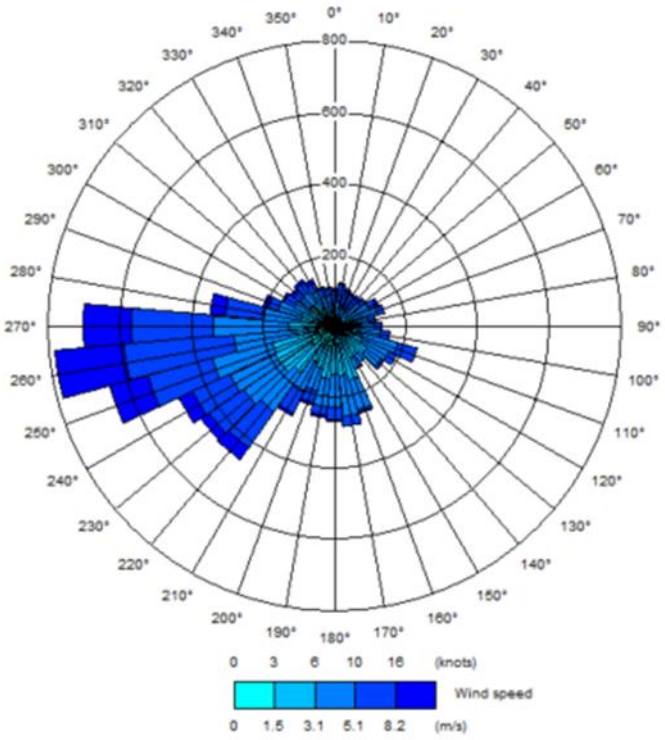

Figure 5: Wind rose of the utilised meteorological data

6.2.8 Based on the criteria shown **Table 16**, the sensitivity of the receiving environment to potential dust impacts was determined as **high**. This is due to the number of residential properties around the Proposed Development Site.

Table 16: Sensitivity of the Surrounding Area to Potential Dust Impacts

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

6.2.9 The sensitivity of the receiving environment to specific potential dust impacts, based on the criteria shown in Section 3.2, is shown in **Table 16.**

6.2.10 The potential risk of dust impacts at the identified receptors is considered in the following sections.

Step 2

Demolition

6.2.11 A demolition assessment has not been conducted since the site is an unoccupied greenfield site.

Earthworks

6.2.12 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling, as well as site levelling and landscaping. The proposed development site covers an area more than 10,000 m^2. In accordance with the criteria outlined in **Table 2**, the magnitude of potential dust emissions from earthworks is therefore **large**.

6.2.13 **Table 16** indicates the sensitivity of the area to dust soiling effects on people and property is **high.** In accordance with the criteria outlined in **Table 8**, the development is considered to be a **high** risk site for dust soiling as a result of earthworks.

6.2.14 **Table 16** indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in **Table 8**, the development is considered to be a **medium** risk site for human health impacts as a result of earthworks.

Construction

6.2.15 The size of the construction the total building volume is likely to be more than 100,000 m^3. In accordance with the criteria outlined in **Table 2**, the magnitude of potential dust emissions from construction is therefore **large**.

6.2.16 **Table 16 i**ndicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in **Table 8**, the development is considered to be a **high** risk site for dust soiling as a result of construction activities.

6.2.17 **Table 16** indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in **Table 8**, the development is considered to be a **medium** risk site for human health impacts as a result of construction activities.

Trackout

6.2.18 Based on the site area, it is anticipated that the unpaved road length will be between 50 - 100m. In accordance with the criteria outlined in **Table 2**, the magnitude of potential dust emissions from trackout is therefore **medium.**

6.2.19 **Table 16** indicates the sensitivity of the area to dust soiling effects on people and property is **high**. In accordance with the criteria outlined in **Table 9**, the development is considered to be a **medium** risk site for dust soiling as a result of trackout activities.

6.2.20 **Table 16** indicates the sensitivity of the area to human health impacts is **medium**. In accordance with the criteria outlined in **Table 9**, the development is considered to be a **low**-risk site for human health impacts as a result of trackout activities.

Summary of the Risk of Dust Effects

6.2.21 A summary of the risk from each dust generating activity is provided in **Table 17.**

Table 17: Unmitigated Dust Risks During Construction

Potential Impact	Unmitigated Risk		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	Medium
Human Health	Medium	Medium	Low

6.2.22 As indicated in **Table 17**, the potential risk of dust soiling is **high** from earthworks and construction, and **medium** from trackout activities. The potential risk of human health effects is therefore **medium** from earthworks and construction, and **low** from trackout activities.

6.2.23 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.

Step 3

6.2.24 The IAQM guidance provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. These have been adapted for the development site as summarised in **Table 18**. These may be reviewed prior to the commencement of construction works and incorporated into a Construction Environmental Management Plan (CEMP), if required by the LA.

Table 18: Fugitive Dust Emission Mitigation Measures

Issue	Control Measure
Communications	Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. Display the head or regional office contact information. Develop and implement a Dust Management Plan, which may include measures to control other emissions, approved by the LA.
Site management	Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. Make the complaints log available to the LA upon request. Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.
Monitoring	Carry out regular site inspections, record inspection results, and make an inspection log available to the LA upon request. Increase the frequency of site inspections when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Site preparation	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. Avoid site runoff of water or mud. Keep site fencing, barriers and scaffolding clean using wet methods. Remove materials that have the potential to produce dust from site as soon as possible. Cover, seed or fence stockpiles to prevent wind whipping.
Operating vehicle/machinery	Ensure all vehicles switch off engines when stationary - no idling vehicles.

Table 18: Fugitive Dust Emission Mitigation Measures	
Issue	**Control Measure**
and sustainable travel	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques. Ensure an adequate water supply on the site for effective dust suppression, using non-potable water where possible and appropriate. Use enclosed chutes and conveyors and covered skips. Minimise drop heights and use fine water sprays 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.
Waste management	No bonfires or burning of waste materials.
Demolition	Ensure effective 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/soil stockpiles to stabilises surfaces as soon as practicable. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. Only remove 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. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos.
Trackout	Use water-assisted dust sweepers on the access and local roads (if required). Avoid dry sweeping of large areas. Ensure vehicles entering and leaving the site are covered to prevent escape of materials during transport. Implement a wheel washing system, if required.

Step 4

6.2.25 Assuming the relevant mitigation measures outlined in **Table 18** are implemented, the residual impacts from all dust generating activities is predicted to be **not significant**, in accordance with the IAQM guidance.

6.3 Operational Phase

Potential Future Exposure

6.3.1 The proposed development includes land use sensitive to long term and short-term pollutant concentrations. Existing conditions at the site are therefore considered in the following Sections.

AQMA Designation

6.3.2 According to the recent AQMAs interactive map[22], there is no AQMAs in Sunderland.

Proximity to Significant Pollution Sources

6.3.3 A desk-top study was undertaken in order to identify any significant pollution sources within the vicinity of the site. There is no identified road vehicle emission source within the vicinity of the site that may contribute significantly to pollution levels above background.

Local Monitoring Results

6.3.4 As shown in **Table 10** and **Table 11** , SCC have undertaken monitoring of annual mean NO_2 concentrations in the vicinity of the proposed development. The recorded concentration at all the monitoring stations were below the annual mean NO_2 AQO in recent years, it is considered likely that pollution levels would also be below at the development.

6.3.5 Based on the above, exceedences of the relevant AQO are considered unlikely at the Proposed Development Site.

Background Pollutant Concentration Predictions

6.3.6 As shown in **Table 12**, background pollutant concentrations for the grid square containing the site are predicted to be well below the annual mean AQOs for NO_2 and PM_{10}.

6.3.7 Based on the predicted background concentrations, exceedances of the relevant AQOs are considered unlikely at the Proposed Development Site.

Summary

6.3.8 It is considered likely that pollutant concentrations are below the relevant AQOs at the Proposed Development Site for the following reasons:

[22] AQMAs interactive map (defra.gov.uk).

- The site is not located within an AQMA;
- Local monitoring results indicate annual mean NO_2 concentrations are below the relevant AQO; and,
- Predicted background concentrations are well below the relevant AQOs.
- Based on the assessment results, exposure of future site users to exceedences of the AQOs is not considered likely. As such, the site is suitable for the proposed use from an air quality perspective.

Potential Development Impacts

6.3.9 Any vehicle movements associated with the development will generate exhaust emissions on the local and regional road networks. Predicted trip generation has been provided by iTransport Planning, the assigned transport consultant for this Project. This indicated that the proposals are predicted to generate 434 AADT.

6.3.10 Based on the provided information, the proposals are will not result in an increase of LDV flows of more than 500 AADT. Additionally, the proposals do not include significant highway realignment or the introduction of a junction and there is unlikely to be a requirement for more than 100 HDV deliveries per day. As such, potential air quality impacts associated with operational phase road vehicle exhaust emissions are predicted to be **not significant**, in accordance with the IAQM screening criteria shown in Section 4.3.

7 CONCLUSIONS

7.1.1 NoiseAir has undertaken an air quality assessment in support of a residential development at Amberley and Harrogate Street, Hendon, Sunderland, SR2 8ES.

7.1.2 There is the potential for the proposals to expose future site users to elevated pollution levels. Therefore, an AQA was undertaken in order to determine baseline conditions at the site and consider its suitability.

7.1.3 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 IAQM methodology. Assuming good practice dust control measures are implemented, the residual significance of potential air quality impacts from dust generated by demolition, earthworks, construction and trackout activities was predicted to be **not significant.**

7.1.4 The potential for exposure of future occupants to exceedences of the AQO was assessed based on AQMA designations, proximity of pollution sources to the site, local monitoring results and background pollutant level predictions. This indicated that concentrations of NO_2 and PM_{10} are likely to be below the relevant AQOs at the development location. As such, the site is considered suitable for the proposed use from an air quality perspective.

7.1.5 During the operational phase of the development there is the potential for air quality impacts as a result of traffic exhaust emissions associated with vehicles travelling to and from the site. These were assessed against the screening criteria provided within the IAQM guidance. Due to the low number of trips anticipated from the proposals, impacts were predicted to be **not significant**.

7.1.6 Based on the assessment results, following best practice guidance, air quality issues are not considered a constraint to the proposed development.

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APPENDIX B - GLOSSARY

Air Quality Limit Value	Legally binding parameters defined in European Union air quality legislation that must not be exceeded. Limit values are set for individual pollutants and are a combination of a concentration value, an averaging time over which it is measured, the number of exceedences allowed per year, and a date by which it must be achieved.
Air Quality Management Area	An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives.
Air Quality Objective	The name given to the maximum ambient pollutant concentration that is not to be exceeded either without exception or within a permitted number of exceedences over a specified timescale for a pollutant outlined in the national Air Quality Strategy.
Air Quality Strategy	A national government document which contains standards, objectives and measures for improving ambient air quality.
Annual Average Daily Traffic	The number of traffic movements on a given road in a 24-hour period as an average across one year.
Background Concentration	The pollutant concentration assumed to represent baseline concentrations in the atmosphere across the modelled area.
Heavy Duty Vehicle	Vehicles with a gross weight of greater than 3.5 tonnes.

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