Luton Borough Council

Kestrel Way SEND School

Air Quality Assessment

Report No.: 445347-01 (00)

AUGUST 2023

RSK GENERAL NOTES

Report No.: 445347-01 (00)

Title: Air Quality Assessment – Kestrel Way SEND School

Client: Luton Borough Council

Date: 04th August 2023

Office: Hemel Hempstead

Status: Final

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Date:	02nd August 2023	Date:	04th August 2023

Abbreviations

AADT	Annual Average Daily Traffic
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQS	Air Quality Standard
Defra	Department for Environment, Food and Rural Affairs
DMP	Dust Management Plan
EC	European Commission
EPUK	Environmental Protection UK
EU	European Union
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
LBC	Luton Borough Council
LLAOL	London Luton Airport Operations Ltd
LLAL	London Luton Airport Ltd
NPPF	National Planning Policy Framework
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
$PM_{2.5}$	Particulate matter of size fraction approximating to <2.5mm diameter
PM_{10}	Particulate matter of size fraction approximating to <10mm diameter

Contents

1 INTRODUCTION

1.1 Background

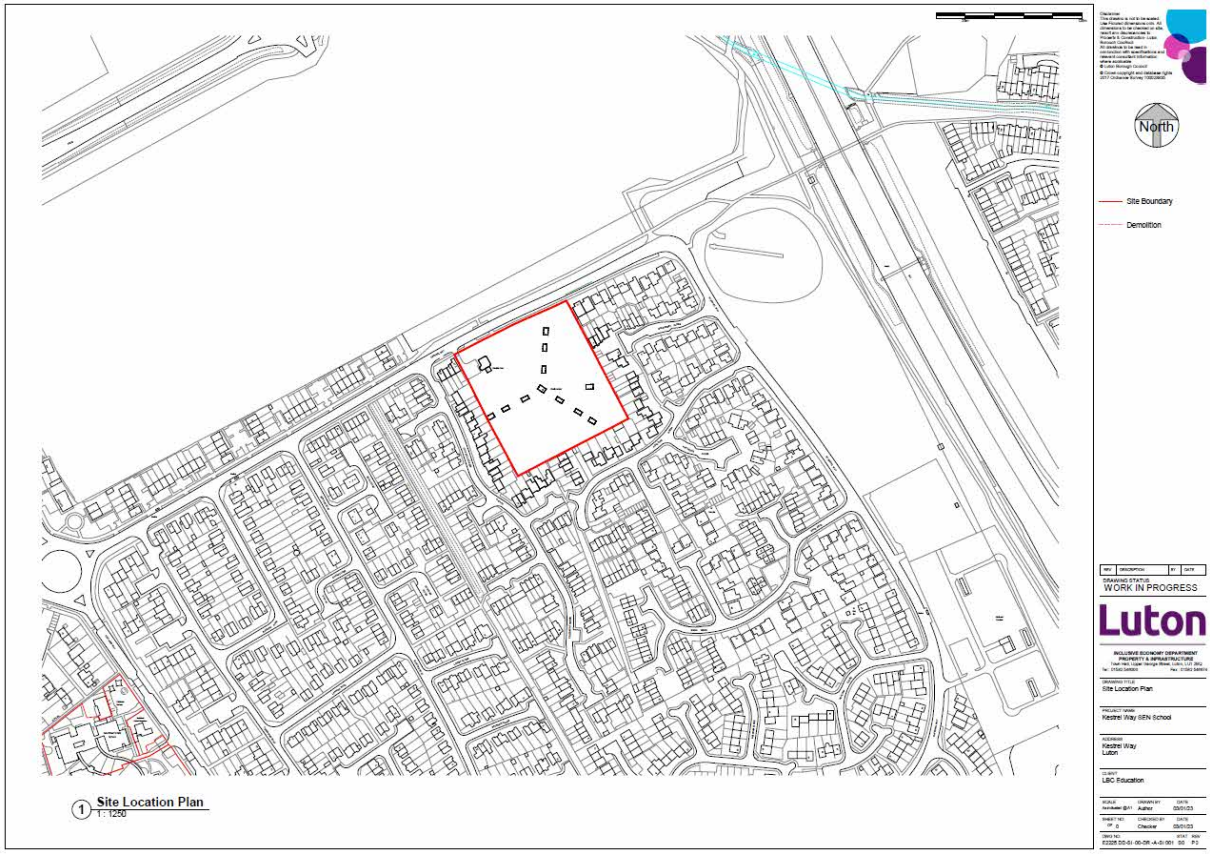
RSK Environment Ltd (RSK) has been instructed by Luton Borough Council to assess the potential air quality impacts of the proposed development of New SEND School, which is located at Kestrel Way, Luton, LU4 0UD. Figure 1 shows the proposed site layout.

The proposed development involves the removal of the existing radio mast and erection of a new build SEND school which will also include a 6/8 bed respite resource centre. The proposed building will extend to a maximum of two stories and provide space for 112 children, there will be 14 classrooms and additional specialist rooms. The building will be 3300sqm, an external play area will be located to the rear of the site with parking and drop-off facilities to the front.

The approximate grid reference of the site is 504324, 224146. The site lies within the administrative area of Luton Borough Council (LBC). The site is bounded to the east, west, and south by existing residential properties, and to the north by Kestrel Way. It is therefore likely that transport emissions from local traffic will be the main source of pollutants at the site.

The following report presents the findings of an assessment of relevant policy, existing/baseline air quality conditions and qualitative consideration of potential air quality impacts during both the construction and operational phase of the proposed development. The potential impacts on local air quality have been considered and, where appropriate, mitigation measures have been recommended.

Figure 1: Proposed Site Layout



2 LEGISLATION, PLANNING POLICY & GUIDANCE

2.1 Air Quality Strategy

UK air quality policy is published under the umbrella of the Environment Act 1995, Part IV and specifically Section 80, the National Air Quality Strategy. The latest *Air Quality Strategy for England, Scotland, Wales and Northern Ireland – Working Together for Clean Air*, published in July 2007 sets air quality standards and objectives for ten key air pollutants to be achieved between 2003 and 2020.

The Clean Air Strategy 2019 supersedes the policies outlined in the 2007 strategy. This latest strategy aims to have a more joined-up approach, outlining actions the Government plans to take to reduce emissions from transport, homes, agriculture and industry. However, the air quality objectives remain as previously detailed within the 2007 strategy.

2.1.1 Air Quality Standards

The air quality standards (AQSs) in the United Kingdom are derived from EC directives and are adopted into English law via the Air Quality (England) Regulations 2000 and Air Quality (England) Amendment Regulations 2002. The Air Quality Limit Values Regulations 2003 and subsequent amendments implement the Air Quality Framework Directive into English Law. Directive 2008/50/EC was translated into UK law in 2010 via the Air Quality Standards Regulations 2010.

The relevant[1] standards for England and Wales to protect human health are summarised in Table 2.1.

Table 2.1: Air Quality Standards (AQS) Relevant to the Proposed Development

Substance	Averaging period	Exceedances allowed per year	Ground level concentration limit ($\mu g/m^3$)
Nitrogen dioxide (NO_2)	1 calendar year	N/A	40
	1 hour	18	200
Fine particles (PM_{10})	1 calendar year	N/A	40
	24 hours	35	50
Fine particles ($PM_{2.5}$)	1 year	N/A	20

2.1.2 The Environment Act, 1995

The set AQSs are to be used in the review and assessment of air quality by local authorities under Section 82 of the Environment Act (1995). If exceedances are measured or predicted through the review and assessment process, the local authority must declare

[1] Relevance, in this case, is defined by the scope of the assessment.

an Air Quality Management Area (AQMA) under Section 83 of the Act, and produce an Air Quality Action Plan (AQAP) to outline how air quality is to be improved.

2.1.3 The Environment Act, 2021

The Environment Act (2021) introduces a commitment to create a legally binding duty on government to reduce the concentrations of fine particulate matter ($PM_{2.5}$) in ambient air.

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023

The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 was published on 31st January 2023, and came into force the following day. The 2023 Regulations introduce a reduced long-term annual average Air Quality Objective for $PM_{2.5}$ of 10 µg/m^3 by 2040, a reduction from the current Air Quality objective of 20 µg/m^3 set out within the Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020. Additionally, the 2023 Regulations introduce an interim target of 12 µg/m^3 by January 2028 and 35% reduction in average population exposure by 2040, with an interim target of a 22% reduction by January 2028, both compared to a 2018 baseline.

2.2 Planning Policy

The land use planning process is a key means of improving air quality, particularly in the long term, through the strategic location and design of new developments. Any air quality concern that relates to land use and its development can, depending on the details of the proposed development, be a material consideration in the determination of planning applications.

2.2.1 National Planning Policy Framework

In July 2021, the revised National Planning Policy Framework (NPPF) was published, superseding the previous 2019 NPPF with immediate effect. The NPPF includes a presumption in favour of sustainable development.

Section 15 of the NPPF deals with Conserving and Enhancing the Natural Environment, and states that the intention is that the planning system should prevent '*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*' and goes on to state that '*new development* [should be] *appropriate for its location' and 'the effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account*.'

With specific regard to air quality, the NPPF states that:

> *'Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air*

quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.'

2.2.2 Luton Local Plan (2011-2031) November 2017

Policy LLP24 - Education and Other Community Facilities

Protection of education and other community facilities

A. Planning permission will be granted for development that contributes towards an identified need for community facilities and services arising from the impact of the development either on-site or off-site within service hubs based in District or Neighbourhood Centres. Development that would lead to a loss of community facilities will be permitted where:

i. existing facilities elsewhere in a suitable location can meet the displaced needs; or

ii. it is unsuitable for alternative community uses for which there is a demonstrable need; or

iii. equivalent or better replacement facilities in terms of quantity and quality are provided in a suitable location.

B. New and extended education, childcare, nursery, and other community facilities will be granted planning permission provided that:

i. a demonstrable local or regional need is established, and the facility is well related to the area it serves;

ii. it would not adversely affect the viability and vitality of a District or Neighbourhood centre;

iii. there would be no unacceptable effect on the amenity of any surrounding residential dwellings and other uses;

iv. it does not take land either in or allocated for other uses, unless it is demonstrated that the need for the facility outweighs that for the existing or allocated use;

v. there is suitable vehicular access and safe dropping off and picking up areas; and

vi. where the proposed facility would be in premises that are used for another purpose, it remains subordinate to the main use of the premises.

2.3 Best Practice Guidance Documents

2.3.1 Guidance on the Assessment of Dust from Demolition and Construction

The Institute of Air Quality Management (IAQM) published a guidance document in 2014 (Holman et al., 2014) on the assessment of construction phase impacts. The guidance was produced to provide advice 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 measure appropriate to the level of risk identified.

2.3.2 Local Air Quality Management Review and Assessment Technical Guidance

The Department for Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their air quality review and assessment work. This guidance, referred to in this document as the Local Air Quality Management Technical Guidance ('LAQM TG.22'), is referred to where relevant.

2.3.3 Land-Use Planning & Development Control: Planning for Air Quality

Environmental Protection UK's (EPUK) and the IAQM jointly published a revised version of the guidance note 'Land-Use Planning & Development Control: Planning for Air Quality' in 2017 (herein the 'EPUK-IAQM guidance') to facilitate consideration of air quality within local development control processes. It provides a framework for air quality considerations, promoting a consistent approach to the treatment of air quality issues within development control decisions.

The guidance includes methods for screening the requirement for an air quality assessment, the undertaking of an air quality assessment and assessing the significance of effects. The guidance note is widely accepted as an appropriate reference method for this purpose.

3 ASSESSMENT SCOPE & METHODS

3.1 Overall Approach

The approach taken for assessing the potential air quality impacts of the proposed development site may be summarised as follows:

Review of relevant policy;

Consultation with the local authority;

Baseline characterisation of local air quality;

Qualitative impact assessment of the construction phase of the development;

Qualitative assessment of air quality impacts during the operational phase of the proposed development using the 2017 EPUK-IAQM guidance; and,

Recommendation of mitigation measures, where appropriate, to ensure any adverse effects on air quality are minimised; and

Identification of residual impacts from the proposed development.

3.2 Baseline Characterisation

Existing or baseline air quality refers to the concentrations of relevant substances that are already present in ambient air. These substances are emitted by various sources, including road traffic, industrial, domestic, agricultural and natural sources.

A desk based study has been undertaken including a review of monitoring data publicly available from Luton Borough Council (LBC) website and estimated background data from the LAQM Support website maintained by Defra. Consideration has also been given to potential sources of air pollution and any AQMAs in the vicinity of the site.

3.3 Construction Phase Assessment

3.3.1 Construction Dust and Particulate Matter

Construction works for the proposed development have the potential to lead to the release of fugitive dust and particulate matter. An assessment of the likely significant effects of construction phase dust and particulate matter at sensitive receptors has therefore been

undertaken following the IAQM's construction dust guidance. Three aspects to dust impacts were considered:

- disamenity or annoyance due to dust soiling;
- The risk of health effects due to an increase in PM_{10} concentrations; and
- Harm to ecological receptors.

In order to assess the potential impacts of construction, activities are divided into four types:

- Demolition;
- Earthworks;
- Construction; and
- Trackout[2].

The risk of dust and PM_{10} arising to cause disamenity and/or health or ecological impacts was based on an assessment of likely emissions magnitude and the sensitivity of the surrounding environment. The risk category may be different for each of the four 'construction' activities.

Appendix A sets out the construction dust assessment methodology in detail as per IAQM guidance. Once the level of risk has been determined, then site specific mitigation proportionate to the level of risk can be identified (as detailed in **Appendix B**).

The Magic Map application available online by Natural England was used to identify statutory ecological receptors near the proposed development site area.

3.3.2 Emissions to Air from Construction Traffic and Plant

Exhaust emissions from construction phase vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the proposed development site and in the vicinity of the proposed development site itself. A qualitative impact assessment of vehicles and plant associated with the construction phase was undertaken using professional judgement and considering the following factors:

- The duration of the construction phase;
- The number and type of construction traffic and plant required; and
- The number and proximity of sensitive receptors to the proposed development sites and along the likely construction vehicle routes.

[2] Trackout is defined as the transport of dust and dirt from the construction / demolition sites onto public road network, where it may be deposited and then re-suspended by vehicles using the network.

3.4 Operational Phase Impact Assessment

3.4.1 Emissions to Air from Operational Phase Traffic

The EPUK-IAQM 2017 guidance provides indicative criteria for when an air quality assessment is required, if none of the criteria are exceeded, it is considered unlikely that there will be any significant impacts, and further assessment should not be required. A simple screening level assessment against these criteria has been undertaken in **Section 5.2** of this report.

3.4.2 Exposure of Future Occupants to Air Pollution

The potential exposure of future occupants of the proposed development has been considered by reviewing the baseline conditions (**Section 4**) and the locations of sensitive receptors within the proposed development, as well as considering the EPUK-IAQM guidance.

It is understood that no significant combustion sources such as combined heat and power (CHP) plant or biomass boilers are proposed as part of the scheme, and this report has therefore not considered emissions related to energy generation any further. The domestic space & water heating be provided by Air Source Heat Pump (ASHP) and gas boiler as a back-up, within the plant room.

4 BASELINE AIR QUALITY CHARACTERISATION

Existing or baseline air quality refers to the concentrations of relevant substances that are already present in ambient air. These substances are emitted by various sources, including road traffic, industrial, domestic, agricultural and natural sources. Baseline air quality data employed in this study have been obtained from monitoring stations maintained by LBC and from the LAQM Support website operated by the Department for Environment, Food and Rural Affairs (Defra).

4.1 Emission Sources and Key Air Pollutants

The application site is bounded to the east, west, and south by existing residential properties, and to the north by Kestrel Way road. It is therefore likely that transport emissions from local traffic will be the main source of pollutants at the site.

The principal pollutants relevant to this assessment are considered to be NO_2, PM_{10} and $PM_{2.5}$, generally regarded as the most significant air pollutants released by vehicular combustion processes, or subsequently generated by vehicle emissions in the atmosphere through chemical reactions.

4.2 Presence of AQMAs

The development site is located within the administrative area of Luton Borough Council (LBC). LBC has declared three Air Quality Management Areas (AQMAs), due to the exceedance of the annual mean nitrogen dioxide (NO_2) objective. The nearest AQMA is Luton AQMA No.2 - Gilderdale Road which is 400m away from the proposed development and Luton AQMA No.1 - Withy Close Road which is 500m away from the proposed development. Therefore, the proposed development is not located within but is located close to and may impact an AQMA.

4.3 Baseline Monitoring Data

A review of the monitoring data available from the Luton Borough Council (LBC) 2021 Annual Status Report suggests that NO_2, PM_{10}, $PM_{2.5}$ levels monitored within the borough using an automatic monitoring sites and NO_2 levels monitored using a non-automatic monitoring sites. LBC undertook automatic (continuous) monitoring of nitrogen dioxide, PM_{10} and $PM_{2.5}$ at one site during 2020 (LN60 / HB007 – Dunstable Road East). Located within AQMA No.3, this analyser is co-located with diffusion tubes LN61, LN62 and LN63. In addition to the monitoring undertaken by Luton Borough Council during 2020:

- London Luton Airport Operations Ltd. (LLAOL) continuously monitored PM_{10} at its site within the airport (LA08 / HB006)
- Defra continuously monitored nitrogen dioxide at its Luton A505 Roadside AURN site (CM2 / LUTR)

London Luton Airport Ltd. (LLAL) continuously monitored multiple species including nitrogen dioxide, PM10 and PM2.5 at its new air quality monitoring station in Wigmore Valley Park (LA001)

LBC undertook non- automatic (i.e. passive) monitoring of NO_2 at 51 sites during 2020. In addition to this, LLAOL undertook similar monitoring at 19 sites and LLAL deployed NO_2 diffusion tubes at a further 11 locations (one of which moved during the course of the year).

The closest monitoring location to the proposed development is approximately 0.5 km and it is roadside to the M1. It is likely to experience similar traffic flows to receptors at the proposed development, therefore this tube is likely to be broadly representative of conditions at the proposed developments receptors closest to the M1.

There were four NO_2 diffusion tubes and no automatic monitoring station within 1 km of the proposed development site. The NO_2 annual mean concentrations for years 2016 to 2020 for this monitoring site can be found in Table 4.1. No exceedances were recorded between 2016 and 2020, at monitoring station LN82 11 Withy Close, the closest monitoring location to the proposed development which has a reading well below 40 µg/m^3. Figure 4.1 shows the selected Non-Automatic Monitoring Locations.

The LAQM TG.22 notes that research indicates that the annual mean NO_2 concentrations tend to be greater than 60µg/m^3 for an exceedance of the hourly mean NO_2 AQS to be likely. Based on the monitoring data presented, it is considered highly unlikely that the annual or hourly-mean NO_2 AQSs would be exceeded at the proposed development site.

Table 4.1: 2016-2020 Annual Average Measured NO_2 Concentrations at the Selected Non-Automatic Monitoring Locations

Site ID	Location	Site type	Approximate Distance from Site (km)	Annual Mean NO_2 Concentrations (µg/m^3)				
				2016	2017	2018	2019	2020
LN18	Copperfields	Roadside	0.9	28.5	24.4	23.9	22.1	16.9
LN81	Bank Close	Suburban	0.8	-	38.1	31.6	30.8	21.8
LN82	11 Withy Close	Suburban	0.5	-	32.3	27.0	27.6	20.9

Site ID	Location	Site type	Approximate Distance from Site (km)	Annual Mean NO_2 Concentrations ($\mu g/m^3$)				
				2016	2017	2018	2019	2020
LN83	b/h 9 Copperfields	Suburban	1.0	-	24.5	24.5	22.5	16.3
Air Quality Objective				**40 ($\mu g/m^3$)**				

**Air quality objective exceeded values are marked in Bold*

Figure 4.1: Selected Non-Automatic Monitoring Locations

4.4 LAQM Background Data

Table 4.3 reproduces the Defra estimated annual average background NO_2, PM_{10} and $PM_{2.5}$ concentrations at the proposed development site for 2023, 2024 and 2025 the anticipated opening year of the proposed development.

Estimated background concentrations do not exceed the annual average air quality objectives for human health for NO_2, PM_{10} or $PM_{2.5}$. As background concentrations are predicted to fall with time, background concentrations in future years would not be

expected to exceed their respective annual mean standards after the proposed development opening year.

It should also be noted that the Defra website states that *'The projections in the 2018 background maps are based on assumptions which were current before the Covid-19 outbreak in the UK. In consequence these maps do not reflect short or longer term impacts on emissions in 2020 and beyond resulting from behavioural change during national or local lockdowns'.*

Table 4.3: Defra LAQM Estimated Annual Average NO_2, PM_{10} and $PM_{2.5}$ Concentrations at the Proposed Development Site (2023, 2024 and 2025, from 2018 base map)

Assessment Year	Estimated Annual Average Pollutant Concentrations Derived from the LAQM Support Website		
	Annual Average NO_2 ($\mu g/m^3$)	Annual Average PM_{10} ($\mu g/m^3$)	Annual Average $PM_{2.5}$ ($\mu g/m^3$)
2023	15.2	17.3	11.0
2024	14.4	17.1	10.8
2025	13.8	17.0	10.7
Air Quality Standard	**40**	**40**	**20***

Notes: Presented concentrations for 1km^2 grid centred on 504324, 224146; approximate centre of development site is 504500, 224500; *Target objective only.

5 ASSESSMENT OF IMPACTS

5.1 Construction Phase

Atmospheric emissions from construction activities will depend on a combination of the potential for emissions (the type of activity and prevailing conditions) and the effectiveness of control measures. In general terms, there are two sources of emissions that will need to be controlled to minimise the potential for adverse environmental effects:

Exhaust emissions from site plant, equipment and vehicles; and,

Fugitive dust emissions from site activities.

5.1.1 Fugitive Dust Emissions

Fugitive dust emissions arising from construction activities are likely to be variable in nature and will depend upon the type and extent of the activity, soil type and moisture, road surface conditions and weather conditions. Periods of dry weather combined with higher than average wind speeds have the potential to generate more dust.

Construction activities that are considered likely to be the most significant potential sources of fugitive dust emissions at the proposed development site are:

Earth moving, due to the handling, storage and deliveries of soil and subsoil materials;

Construction aggregate usage, due to the transport, unloading, storage and use of dry and dusty materials (such as cement and sand);

Movement of heavy site vehicles on dry or untreated haul routes; and,

Movement of vehicles over surfaces where muddy materials have been transferred off-site (for example, on to public highways).

Fugitive dust and emissions arising from construction activities is mainly of a particle size greater than the PM_{10} fraction (that which can potentially impact upon human health), however it is noted that construction activities may contribute to local PM_{10} concentrations. Appropriate dust control measures can be highly effective for controlling emissions from potentially dust generating activities identified above, and adverse effects can be greatly reduced or eliminated. For a conservative assessment, the potential impacts considered below are based on a pre-mitigation scenario.

5.1.2 Potential Dust Emission Magnitude

With reference to the IAQM 2014 criteria outlined in **Appendix A**, the estimation of dust emission magnitudes for demolition, earthworks, construction and trackout activities are presented in Table 5.1.

Details given in the sections below have been provided by the client and where details are unknown professional judgement has been used where appropriate.

Table 5.1: Summary of Dust Emission Magnitudes (Before Mitigation)

Activity	IAQM Criteria	Dust Emission Magnitude
Demolition	- Total area of the sites is 20,000m^3 – 50,000m^3 - No onsite crushing and screening proposed - Height of demolition activities >20m	**Medium**
Earthworks	- Total area of the sites is between 2,500–10,000m^2. - Soils comprise mainly clay - The number of earth moving vehicles active at any one time will be <5. - Height of stockpile material <4m	**Medium**
Construction	- Total building volume will be < 25,000m^3. - Construction materials are likely to be typical building materials (e.g. bricks, mortar, tiles, timber etc.) which are considered to be potentially dusty. - No on-site concrete batching will occur. - No on-site sandblasting will occur.	**Small**
Trackout	- The maximum number of HDV outward movements in any one day will be <10. - It is estimated that the length of unpaved road on site would be 10-50m. - Haul roads will be granular and wheelwashed at point of exit	**Small**

5.1.3 Sensitivity of the Area

As per the IAQM Guidance, the sensitivity of the area takes into account a number of factors, including:

The sensitivity of individual receptors in the area;

The proximity and number of those receptors;

For the human health assessment, the local background annual mean PM_{10} concentration (taken from the mapped estimates in Table 4.2); and,

Site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

Consideration is given to human and ecological receptors, where present, from the impact of the construction site boundary and routes along which Heavy Duty Vehicles (HDVs) may facilitate trackout.

Table 5.2 presents the determined sensitivity of the area with the factors itemised which have helped to define this.

Earthworks and construction activities are relevant up to 350m from the proposed development site boundary whereas trackout activities are only considered relevant up to 50m from the edge of the road up to 50m from the site access (based on small dust

emission magnitude), as per the guidance. Therefore, 20m, 50m and 200m buffers are considered for trackout activities. The site access for construction traffic will be from Kestrel Way road.

No ecological receptors were identified within 50m of the site boundary or trackout route, based on information available from the Magic Map application (available online by Natural England). Human receptors were identified by making reference to online publicly available satellite imagery.

Table 5.2: Sensitivity of the Area

Potential Impact		Sensitivity of the surrounding area			
		Demolition	**Earthworks**	**Construction**	**Trackout**
Dust soiling	Receptor sensitivity	High	High	High	High
	Number of receptors	10-100	10-100	10-100	10-100
	Distance from the source	<20m	<20m	<20m	<20m
	Sensitivity of the area	**High**	**High**	**High**	**High**
Human health	Receptor sensitivity	High	High	High	High
	Annual mean PM_{10} concentration	<24µg/m^3	<24µg/m^3	<24µg/m^3	<24µg/m^3
	Number of receptors	10-100	10-100	10-100	10-100
	Distance from the source	<20m	<20m	<20m	<20m
	Sensitivity of the area	**Low**	**Low**	**Low**	**Low**
Ecological	N/A				

Figure 5.1: Construction Buffers at the development site

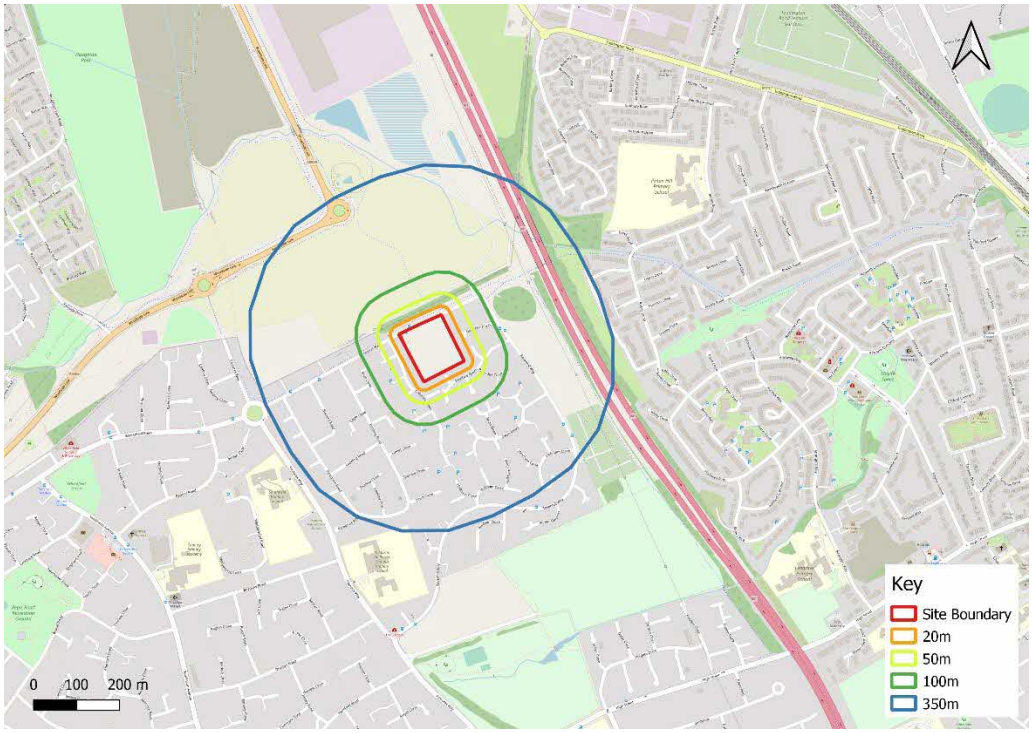


Figure 5.2: Trackout Buffers at the development site

5.1.4 Risk of Impacts

The dust emission magnitude summarised in Table 5.1 has been combined with the sensitivity of the area in Table 5.2 to determine the risk of impacts of construction activities before mitigation; these have been evaluated based on risk categories of each activity in **Appendix B**.

The risk of dust impacts from construction activities is identified as ranging between medium to low risk, as shown in Table 5.3. Site specific mitigation measures to reduce construction phase impacts are defined based on this assessment in **Section 6**.

Table 5.3: Summary of the Dust Risk from Construction Activities

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust soiling	Medium	Medium	Low	Low
Human health	Low	Low	Negligible	Negligible
Ecological	N/A			

5.1.5 Exhaust Emissions from Construction Plant and Vehicles

The operation of vehicles and equipment powered by internal combustion engines results in the emission of exhaust gases containing pollutants including NO_x, PM_{10}, $PM_{2.5}$, volatile organic compounds, and carbon monoxide. The quantities emitted depend on factors such as engine type, service history, pattern of usage and fuel composition.

Construction traffic will likely comprise of haulage vehicles and vehicles used for workers' trips to and from the application site. The greatest impact on air quality due to emission from construction phase vehicles will be in areas adjacent to the application site access and nearby road network.

It has been estimated by the client that the number of daily HGVs entering and leaving the site will be <10 HGV in any one day. The likely route used to access the site would be Villa Road, which is bounded by some residential properties and the neighbouring Church.

The EPUK-IAQM 2017 guidance provides indicative criteria to determine when air quality impacts are likely to be significant. For HGVs, outside of an AQMA, an increase of 100 trips per day as an AADT is the indicative criterion. The predicted construction HDV traffic generation is well below the criterion therefore it is considered that a significant impact would be unlikely. Furthermore, existing air quality is good, and the construction phase will be limited to a relatively short period therefore any impact would be temporary, i.e. the duration of the construction period only.

The operation of site equipment and machinery/plant during the construction phase will result in emissions to the atmosphere of exhaust gases, but with suitable controls and site management such emissions are unlikely to be significant (as per guidance within LAQM TG(22)).

5.2 Operational Phase

5.2.1 Emissions to Air from Operational Phase Road Traffic

The project transport consultant, has estimated that the proposed development is predicted to generate 274 Light Duty Vehicle (LDV) and no Heavy Good Vehicle (HGV) as 24-Hour AADT.

The EPUK-IAQM 2017 guidance provides indicative criteria to determine when an air quality assessment is likely to be required. Table 5.4 presents a comparison of the relevant EPUK-IAQM screening criteria with traffic and other information on the proposed development. The predicted increase in flows is well below the 500 AADT criterion for light duty traffic generation, suggesting a significant impact would be unlikely and further assessment would normally not be required.

Table 5.4: Screening Criteria from EPUK-IAQM Guidance and Comparison with the Proposed Development Operational Phase

EPUK-IAQM Screening Criteria	Comparison of proposed development to screening criteria
A change of Light Duty Vehicles (LDVs) of: - More than 500 Annual Average Daily Traffic (AADT) not within an AQMA - More than 100 AADT within an AQMA	**Criterion not exceeded:** The proposed development generate 274 Light Duty Vehicle (LDV) and therefore not expected to increase AADT
A change of Heavy Duty Vehicles (HDVs) of: - More than 100 AADT not within an AQMA - More than 25 AADT within an AQMA	**Criterion not exceeded:** The proposed development do not generate Heavy Duty Vehicle (HDV) per day.
Road realignment, where the change is 5m or more and the road is within an AQMA.	**Criterion not exceeded:** No significant realignment of existing roads within AQMA.
Introduction of a new junction or the removal of an existing junction near to relevant receptors. This applies to junctions that cause traffic to significantly change vehicle accelerate/ decelerate, e.g. traffic lights, or roundabouts.	**Criterion not exceeded:** It is understood that no junctions proposed will cause any significant changes to the traffic flow.
Introduction or change of a bus station, where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.	**Criterion not exceeded:** the development is not expected to introduce any additional bus routes.
Have an underground car park with extraction system, where the ventilation extract for the car park will be within 20m of a relevant receptor.	**Criterion not exceeded:** No underground car parking is proposed.

EPUK-IAQM Screening Criteria	Comparison of proposed development to screening criteria
Coupled with the car park having more than 100 movements per day (total in and out).	
Have one or more substantial combustion processes, where there is a risk of impacts at relevant receptors.	**Criterion not exceeded:** It is understood that substantial combustion processes are not proposed.

The EPUK-IAQM criterion for further assessment is **not exceeded** for any screening criteria and further assessment of the operational phase traffic is not considered to be required.

5.2.2 Exposure of Future Development Users to Air Pollution

The potential exposure of future users of the proposed development to poor air quality has been considered by undertaking a qualitative review of the baseline conditions (Section 4) and the locations of sensitive receptors within the proposed development.

Based on the local monitoring data and estimated background concentrations from Defra, the annual mean NO_2, PM_{10} and $PM_{2.5}$ air quality objectives are considered unlikely to be exceeded at the site.

The EPUK-IAQM 2017 guidance indicates that the annual mean PM_{10} concentrations tend to be greater than ~31µg/m^3 for an exceedance of the daily mean PM_{10} AQS to be likely. LAQM TG.22 indicates that the annual mean NO_2 concentrations tend to be greater than 60µg/m^3 for an exceedance of the hourly mean NO_2 AQS to be likely. Based on the monitoring data available and the estimated background concentrations of NO_2 and PM_{10}, it is considered unlikely that annual mean or short-term NO_2 and PM_{10} AQSs would be exceeded at or in close proximity to the proposed development site.

Although the proposed development is close to the M1, the monitoring station LN82 11 Withy Close, which is the closest monitoring location to the proposed development has a reading well below 40 µg/m^3.

Overall, exceedances of any of the relevant AQSs are not anticipated at the site; therefore, the existing air quality conditions are considered to be good.

6 MITIGATION MEASURES & RESIDUAL IMPACTS

6.1 Construction Phase Mitigation

The dust emitting activities outlined in **Section 5.1** can be effectively controlled by appropriate dust control measures and any adverse affects can be greatly reduced or eliminated.

A dust management plan (DMP) (which may form part of a Construction Environmental Management Plan (CEMP), should be prepared and agreed with the local authority to ensure that the potential for adverse environmental effects on local receptors is minimised. The recommended mitigation measures, based on the dust risk assessment, are contained in Appendix B.

6.2 Operational Phase Mitigation

As identified in Section 5.2, no significant operational phase impacts on local air quality are anticipated. Ambient air quality is not expected to have significant adverse effects on future site users. Therefore, the impact of the operational phase of the proposed development on local air quality is considered to be negligible.

Nonetheless, best practice measures should be used to minimise impacts, such as:

A ‘green travel plan’ to minimise travel by private cars;

Provision of electric vehicle charging points to support the shift towards zero emission vehicles;

Electric or renewable space and domestic water heating should be specified where practicable;

Any gas boilers should be ‘low NOx’.

6.3 Residual Impacts

With the implementation of the proposed construction phase mitigation measures (detailed in **Appendix B**), the residual impacts are considered to be **Low**.

It is recommended that no further assessment is required for operational phase impacts.

7 CONCLUSIONS

A qualitative air quality assessment for the proposed New SEND School has been prepared with reference to existing air quality in the area and relevant air quality legislation, policy and guidance.

An assessment of construction phase impacts has been undertaken following the IAQM construction dust guidance. The potential risk of construction phase impacts from dust soiling was predicted to range from low to medium risk depending on the type of works, and on human health was predicted to be low risk. Mitigation measures are recommended to reduce the risk of dust and particulate matter being generated and re-suspended. With implementation of the appropriate measures, no significant impacts are anticipated during the construction phase.

The impact of construction phase traffic and plant from the proposed development will be limited to a relatively short period. Any effects on air quality will be temporary i.e. during the construction period only and can be suitably controlled by the employment of mitigation measures appropriate to the development project, and are therefore unlikely to materially impact on local air quality.

A qualitative impact assessment of the operational impacts was undertaken with reference to the EPUK-IAQM guidance. Based on the traffic data provided, it is understood that the proposed development is not expected to exceed the EPUK-IAQM screening criteria of more than 500 AADT for Light Duty Vehicles/100 AADT for Heavy Duty Vehicles, therefore, a significant impact is unlikely and further assessment should not be required.

Air quality monitoring and the estimated background concentrations of NO_2, PM_{10} and $PM_{2.5}$, suggest that no exceedances of any of the relevant air quality objectives are likely, and air quality is likely to be well within the objectives.

Overall, the proposed development is not likely to increase exposure to poor air quality and the impact of ambient air quality on the receptors introduced is likely to be insignificant.

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APPENDIX A CONSTRUCTION DUST ASSESSMENT METHODOLOGY

To assess the potential impacts, construction activities are divided into demolition, earthworks, construction and trackout. The descriptors included in this section are based upon the IAQM guidance. The assessment follows the steps recommended in the guidance.

Step 1 and Step 2 methods from the IAQM guidance are described in this Appendix to assign dust risk categories for each of the construction activities.

Step 1: Screen the requirement for assessment

The first step is to screen out the requirement for a construction dust assessment, this is usually a somewhat conservative level of screening. An assessment is usually required where there is:

a 'human receptor' within:

- 350m of the boundary of the site; or
- 50m of the route used by construction vehicles on the public highway, up to 500m from the site entrance(s).

an 'ecological receptor':

- 50m of the boundary of the site; or
- 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

Step 2A: Defining the Potential Dust Emission Magnitude

Demolition

The dust emission magnitude category for demolition is varied for each site in terms of timing, building type, duration and scale. Examples of the potential dust emission classes are provided in the guidance as follows:

Large: Total building volume >50,000m^3, potentially dusty construction material, on-site crushing and screening, demolition activities >20m above ground level;

Medium: Total building volume 20,000m^3 – 50,000m^3, potentially dusty construction material, demolition activities 10m – 20m above ground level; and,

Small: Total building volume <20,000m^3, construction material with low potential for dust release, demolition activities <10m above ground, demolition during wetter months.

Earthworks

The dust emission magnitude category for earthworks is varied for each site in terms of timing, geology, topography and duration. Examples of the potential dust emission classes are provided in the guidance as follows:

Large: Total site area >10,000m^2, potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds >8m in height, total material moved >100,000 tonnes;

Medium: Total site area 2,500 – 10,000m^2, moderately dusty soil type (e.g. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8m in height, total material moved 20,000 – 100,000 tonnes; and,

Small: Total site area < 2,500m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <4m in height, total material moved <10,000 tonnes, earthworks during wetter months.

Construction

The dust emission magnitude category for construction is varied for each site in terms of timing, building type, duration, and scale. Examples of the potential dust emissions classes are provided in the guidance as follows:

Large: Total building volume >100,000m^3, piling, on site concrete batching;

Medium: Total building volume 25,000 – 100,000m^3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching; and,

Small: Total building volume <25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout

Factors which determine the dust emission magnitude class of trackout activities are vehicle size, vehicle speed, vehicle number, geology and duration. Examples of the potential dust emissions classes are provided in the guidance as follows:

Large: >100 HDV (3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;

Medium: 25 – 100 HDV (>3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100m; and,

Small: <25 HDV (<3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length <50m.

Step 2B: Defining the Sensitivity of the Area

The sensitivity of the area is defined for dust soiling, human health and ecosystems. The sensitivity of the area takes into account the following factors:

The specific sensitivities of receptors in the area;

The proximity and number of those receptors;

In the case of PM_{10}, the local background concentration; and,

Site-specific factors, such as whether here are natural shelters such as trees, to reduce the risk of wind-blown dust.

Table A1 has been used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Table B1: Sensitivity of the Area Surrounding the Site

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
High	Users can reasonably expect an enjoyment of a high level of amenity. The appearance, aesthetics or value of their property would be diminished by soiling. The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) Examples include residential properties, hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.	Locations with an international or national designation *and* the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain. Examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home. The appearance, aesthetics or value of their property could be diminished by soiling. The 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. Examples include parks and places of work.	Locations where the people exposed are workers and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Examples include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. Locations with a national designation where the features may be affected by dust deposition. Example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
Low	The enjoyment of amenity would not reasonably be expected. Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.	Locations where human exposure is transient. Indicative examples include public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. Example is a local Nature Reserve with dust sensitive features.

Based on the sensitivities assigned of the different types of receptors surrounding the site and numbers of receptors within certain distances of the site, a sensitivity classification for the area can be defined for each. Tables A2 to A4 indicate the method used to determine the sensitivity of the area for dust soiling, human health and ecological impacts, respectively.

For trackout, as per the guidance, it is only considered necessary to consider trackout impacts up to 50m from the edge of the road.

Table B2: Sensitivity of the area to dust soiling effects on people and property

Receptor Sensitivity	Number of Receptors	Distances from the Source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table B3: Sensitivity of the area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Conc.	Number of Receptors	Distances from the Source (m)				
			<20	<50	<100	<200	<350
High	>32μg/m^3	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low

Receptor Sensitivity	Annual Mean PM_{10} Conc.	Number of Receptors	Distances from the Source (m)				
			<20	<50	<100	<200	<350
	28-32 µg/m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium*	-	>10	High	Medium	Low	Low	Low
	-	1-10	Medium	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Note: The IAQM guidance recommends a further breakdown of 'medium risk' categories, although these are less conservative and have therefore not been utilised in this assessment.

Table B4: Sensitivity of the area to Ecological Impacts

Receptor Sensitivity	Distances from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

<u>Step 2C</u>: Defining the Risk of Impacts

The final step is to use both the dust emission magnitude classification with the sensitivity of the area, to determine a potential risk of impacts for each construction activity, before the application of mitigation. Tables A5 to A7 indicate the method used to assign the level of risk for each construction activity.

Table B5: Risk of Dust Impacts from Demolition

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

Table B6: Risk of Dust Impacts from Earthworks/Construction

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

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

Table B7: Risk of Dust Impacts from Trackout

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

APPENDIX B CONSTRUCTION PHASE RECOMMENDED MITIGATION MEASURES

The IAQM 2014 guidance divides site-specific mitigation measures are divided into general measures applicable to all sites, and measures specific to earthworks, construction and trackout. Depending on the level of risk assigned in relation to each type of construction activity, different mitigation is assigned. The method for assigning mitigation measures as detailed in the IAQM guidance has been used. For those 'general' mitigation measures, the greatest risk category assigned to the assessed construction activities should be applied. Therefore, in this case, the 'medium risk' 'general' site mitigation measures have been recommended.

There are two categories of mitigation measure – 'highly recommended' and 'desirable', which are indicated according to the dust risk level identified in Table 5.3. Desirable measures are presented in *italics*.

Communications

Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.

Display the name and contact details of people 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.

Dust Management

Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and/or visual inspections.

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 local authority when asked.

Record any exceptional incidents that cause dust and/or air emissions, either on- or off-site or the action taken to resolve the situation in the log book.

Monitoring

Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority if asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary.

Carry out regular site inspections to monitor compliance with any dust management plan, record inspection results, and make an inspection log available to the local authority when asked.

Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Council.

Preparing and maintaining the site

Plan site layout so that machinery and dust causing activities are located away from receptors as far as possible.

Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.

Fully enclose site specific operations where there is a high potential for dust production and the site is active for an extensive period.

Avoid site runoff of water or mud.

Keep site fencing, barriers and scaffolding clean using wet methods.

Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.

Cover, seed or fence stockpiles to prevent wind whipping.

Operating Vehicles/Machinery

Ensure all NRMM meet the required emission standards.

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 practicable.

Impose and signpost a maximum-speed-limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas.

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 suppression/mitigation, using non-potable water where possible and appropriate.

Use enclosed chutes 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 as soon as reasonably practicable after the event using wet clean methods.

Waste Management

Avoid bonfires or burning of waste materials.

Measures Specific to Earthworks

Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable

Use Hessian, mulchers or trackifiers where it is not possible to re-vegetate to cover with topsoil, as soon as practicable

Only remove the cover in small areas during work and not all at once.

Measures Specific to 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.

Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.

For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.

Avoid dry sweeping of large areas.

Ensure vehicles entering and leaving sites are covered to prevent the escape of materials during transport.

Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.

Record all inspections of haul routes and subsequent action in site log book.

Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.

Implement wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

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 10 m from receptors where possible.