South East Strategic Reservoir Option

Preliminary Environmental Information Report

Appendix 13.1 - Air quality assessment methodology

Date: October 2025

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1 Air Quality Assessment Methodology

1.1 Introduction

1.1.1 This document provides supplementary assessment methodology information relevant to the air quality assessment for the Project. It forms an appendix to, and is intended to be read in conjunction with Chapter 13: Air quality.

1.2 Construction Dust Assessment Methodology

1.2.1 The construction phase effects of the Project have been assessed using the qualitative approach described in the dust guidance published by the Institute of Air Quality Management (IAQM, 2024). The guidance applies to the assessment of dust from construction/demolition activities.

1.2.2 The IAQM dust guidance (IAQM, 2024) considers the potential for dust emissions from dust generating activities, such as demolition of existing structures, earthworks, construction of new buildings and trackout. 'Earthworks' refer to the processes of soil stripping, ground levelling, excavation and land capping. 'Trackout' refers to the transport of dust and dirt from the site onto the public road network where it may be deposited and then re-suspended by vehicles using the network. This arises when vehicles leave the site with dusty materials, which may then spill onto the road, or when they travel over muddy ground on-site and then transfer dust and dirt onto the public road network.

1.2.3 For each of these dust-generating activities, the guidance considers three separate effects:

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

1.2.4 The receptors can be human or ecological and are identified based on their sensitivity to dust soiling and PM_{10} exposure. Further information about receptors that are likely to experience a change in pollutant concentrations and/or dust nuisance due to the construction of the Project is provided in 1.2.17 to 1.2.32.

1.2.5 The methodology takes into account the scale at which the above effects are likely to be generated (classed as small, medium or large dust emission magnitude), the levels of background PM10 concentrations and the distance to the closest receptor, in order to determine the sensitivity of the area. This is then taken into consideration when deriving the overall dust impact for the site, this is known as risk (classed as negligible, low, medium and high). Suitable mitigation measures are also proposed to reduce the risk of the potential impacts on local air quality as a result of the construction works.

1.2.6 There are five steps in the assessment process described in the IAQM dust guidance as summarised below and illustrated in Plate 1.1, and explained below.

Step 1: Need for assessment

1.2.7 The first step is the initial screening for the need for a detailed assessment. According to the IAQM dust guidance, an assessment is required where there are sensitive receptors

within 250m of the draft Order limits (for ecological receptors that is 50m) and/or human receptors within 50m of the route(s) used by the construction vehicles on the public highway and up to 250m from the site entrance(s).

Step 2: Assess the risk of dust impacts

1.2.8 This step is split into three sections as follows:

- 2A. Define the potential dust emission magnitude
- 2B. Define the sensitivity of the area
- 2C. Define the risk of impacts

1.2.9 Each of the dust-generating activities is given a dust emission magnitude depending on the scale and nature of the works (step 2A) based on the criteria presented in Table 1.1.

1.2.10 The sensitivity of the area is then determined (step 2B) for each dust effect from the above dust-generating activities, based on the proximity and number of receptors, their sensitivity to dust (defined in 1.2.16) and the local PM_{10} background concentrations. Table 1.2, Table 1.3 and Table 1.4 show the criteria for defining the sensitivity of the area to different dust effects.

1.2.11 The overall risk of the impacts for each activity is then determined (step 2C) prior to the application of any mitigation measures and an overall risk for the site derived (Table 1.5).

Step 3: Determine the site-specific mitigation

1.2.12 Once each of the activities is assigned a risk rating, appropriate mitigation measures are identified. Where the risk is negligible, no mitigation measures beyond those required by legislation are necessary.

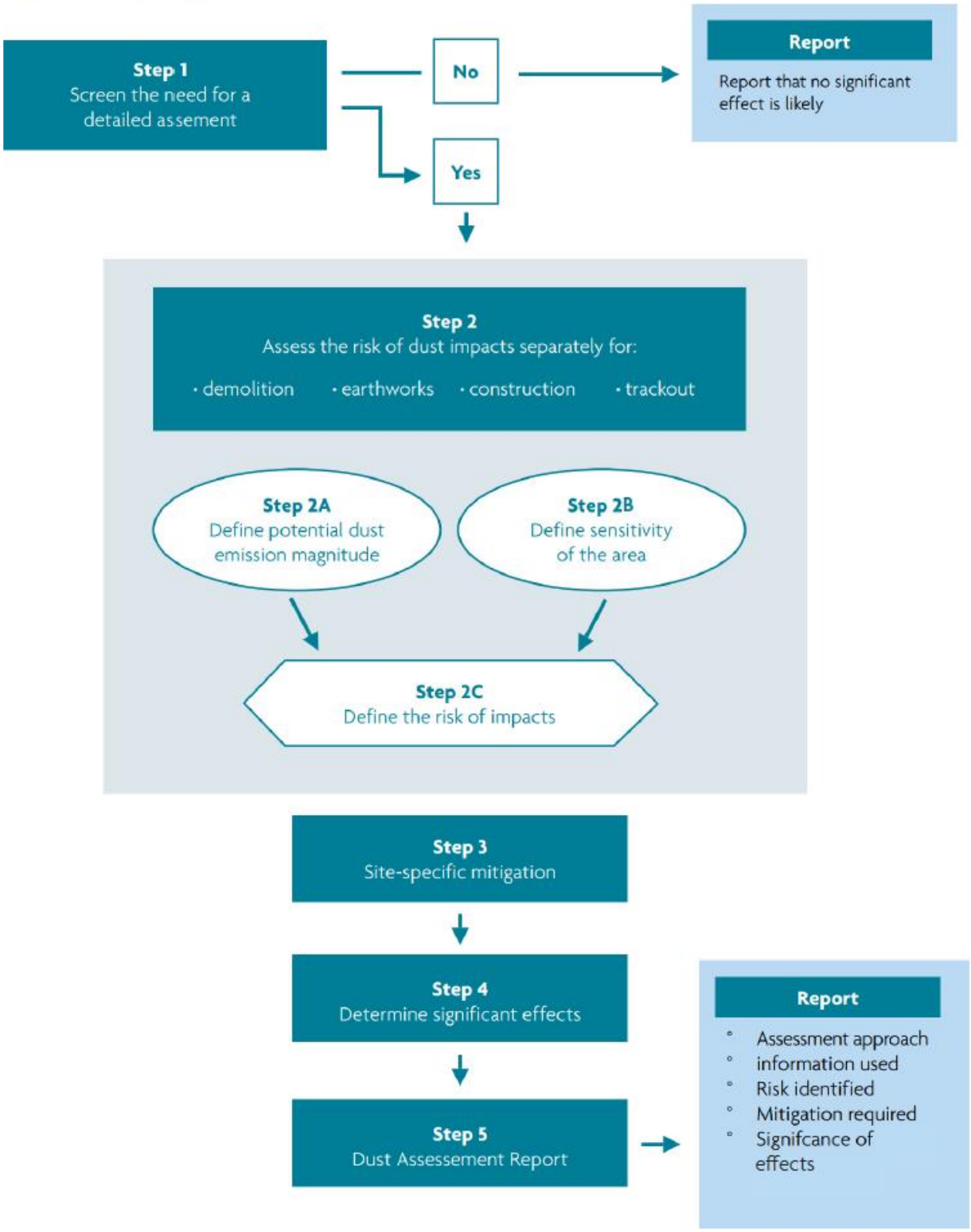
Step 4: Determine significant effects

1.2.13 Once the risk of dust impacts has been determined and the appropriate dust mitigation measures identified, the next step is to determine whether there are any residual significant effects. The IAQM dust guidance notes that it is anticipated that with the implementation of effective mitigation measures detailed in Appendix 2.2: Draft commitments register, the environmental effect will not be significant in most cases.

Step 5: Reporting

1.2.14 The last step of the assessment is the reporting of the assessment. This forms part of the PEI Report (see Chapter 13: Air quality).

Plate 1.1 IAQM 2024 dust methodology



Dust emission magnitude (Step 2A)

1.2.15 The following provides further information of how to define the dust magnitude (Step 2A) which forms part of the IAQM dust methodology.

Table 1.1 Dust emission magnitude (source : IAQM Guidance on the assessment of dust from demolition and construction (2024))

Small	Medium	Large
Demolition		
• Total building volume <12,000m³ • Construction material with low potential for dust release (e.g. metal cladding or timber) • Demolition activities <6m above ground • Demolition during wetter months	• Total building volume 12,000 - 75,000m³ • Potentially dusty construction material (e.g. a mixture of material with low dust potential but with some potentially dusty content such as concrete) • Demolition activities 6-12m above ground level	• Total building volume >75,000m³ • Potentially dusty construction material (e.g. concrete) • On-site crushing and screening • Demolition activities >12m above ground level
Earthworks		
• Total site area <18,000m² • Soil type with large grain size (e.g. sand) • <5 heavy earth moving vehicles active at any one time • Formation of bunds <3m in height	• Total site area 18,000m² – 110,000m² • Moderately dusty soil type (e.g. silt) • 5 – 10 heavy earth moving vehicles active at any one time • Formation of bunds 3 - 6m in height	• Total site area >110,000m² • Potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size) • >10 heavy earth moving vehicles active at any one time • Formation of bunds >6m in height
Construction		
• Total building volume <12,000 m³ • Construction material with low potential for dust release (e.g. metal cladding or timber)	• Total building volume 12,000 - 75,000m³ • Potentially dusty construction material (e.g. concrete) • On-site concrete batching	• Total building volume >75,000m³ • Construction activities such as on-site concrete batching and sandblasting
Trackout		
• <20 Heavy Duty Vehicle (HDV) (>3.5t) outward movements in any one day • Surface material with low potential for dust release • Unpaved road length <50m	• 20 – 50 HDV (>3.5t) outward movements in any one day • Moderately dusty surface material (e.g. high clay content) • Unpaved road length 50 – 100m	• >50 HDV (>3.5t) outward movements in any one day • Potentially dusty surface material (e.g. high clay content) • Unpaved road length >100m
Note: Where the magnitude description straddles more than one category, the determination of dust emission magnitide has been applied using professional judgement.		

Define the sensitivity of the area (Step 2B)

1.2.16 Below provides guidance on the sensitivity of different types of receptors to dust soiling, health effects and ecological effects (Step 2B), as part of the IAQM methodology and in line with the latest 2024 dust guidance published by the IAQM.

Sensitivities of people to dust soiling effects

High sensitivity receptor

1.2.17 High sensitivity receptors can reasonably expect enjoyment of a high level of amenity. 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. Further, the appearance, aesthetics or value of their property would be diminished by soiling.

1.2.18 Examples of high sensitivity receptor examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.

Moderate sensitivity receptor

1.2.19 Moderate sensitivity receptors 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 people or property would not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Further, the appearance, aesthetics or value of their property could be diminished by soiling.

1.2.20 Indicative moderate sensitivity receptor examples include parks and places of work.

Low sensitivity receptor

1.2.21 Low sensitivity receptors would typically experience 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. Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling.

1.2.22 Indicative low sensitivity receptor examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads.

Sensitivities of people to health effects

High sensitivity receptor

1.2.23 High sensitivity receptors are expected to be present at 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).

1.2.24 Indicative high sensitivity receptor examples include residential properties. Hospitals, schools and residential care homes are also considered as having equal sensitivity to residential areas for the purposes of this assessment.

Moderate sensitivity receptor

1.2.25 Moderate sensitivity receptors are expected to be present at 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).

1.2.26 Indicative moderate sensitivity receptors examples include office and shop workers, but do not generally include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.

Low sensitivity receptor

1.2.27 Low sensitivity receptors are expected to be present at locations where human exposure is transient.

1.2.28 Indicative low sensitivity receptors examples include public footpaths, playing fields, parks and shopping streets.

Sensitivities of receptors to ecological effects

High sensitivity receptor

1.2.29 High sensitivity receptor are locations with an international or national designation and the designated features may be affected by dust soiling, including community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain.

1.2.30 Indicative high sensitive receptor may include, for example, Special Areas of Conservation (SACs) designated for acid heathlands or local sites designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.

Moderate sensitivity receptor

1.2.31 Moderate sensitivity receptors are locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown. They could be locations with a national designation where the features may be affected by dust deposition.

1.2.32 An indicative moderate sensitive receptor example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.

Low sensitivity receptor

- Low sensitive receptor locations with a local designation where the features may be affected by dust deposition.
- An indicative low sensitive receptor example is a local Nature Reserve with dust sensitive features.

Sensitivity of the area to dust soiling effects

Table 1.2 Sensitiviy of the area to dust soiling effects

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 250
High	> 100	High	High	Moderate	Low
	10 – 100	High	Moderate	Low	Low
	1 - 10	Moderate	Low	Low	Low
Moderate	> 1	Moderate	Low	Low	Low

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 250
Low	> 1	Low	Low	Low	Low
Source: IAQM Guidance on the assessment of dust from demolition and construction (2024)					

Sensitivity of the area to human health impacts from dust

Table 1.3 Sensitivity of the area to human health impacts (high sensitivity receptors)

Background PM_{10} concentrations (annual mean)	Number of receptors	Distance from the source (m)			
		< 20	< 50	< 100	< 250
> 32µg/m³	> 100	High	High	High	Moderate
	10 – 100	High	High	Moderate	Low
	1 - 10	High	Moderate	Low	Low
28 – 32µg/m³	> 100	High	High	Moderate	Low
	10 – 100	High	Moderate	Low	Low
	1 - 10	High	Moderate	Low	Low
24 – 28µg/m³	> 100	High	Moderate	Low	Low
	10 – 100	High	Moderate	Low	Low
	1 - 10	Moderate	Low	Low	Low
< 24µg/m³	> 100	Moderate	Low	Low	Low
	10 – 100	Low	Low	Low	Low
	1 - 10	Low	Low	Low	Low
Source: IAQM Guidance on the assessment of dust from demolition and construction (2024)					

Sensitivity of the area to ecological impacts

Table 1.4 Sensitvity to the area to ecological impacts from dust

Receptor sensitivity	Distance from the source (m)	
	< 20	< 50
High	High	Medium
Moderate	Medium	Low
Low	Low	Low
Source: IAQM Guidance on the assessment of dust from demolition and construction (2024)		

Risk of dust impacts (Step 2C)

Table 1.5 Risk of Dust Impacts

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk

Sensitivity of area	Dust emission magnitude		
	Large	Medium	Small
Moderate	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Moderate	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Moderate	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk site
Moderate	Medium risk	Medium risk	Low risk site
Low	Low risk	Low risk	Negligible

Source: IAQM Guidance on the assessment of dust from demolition and construction (2024)

1.3 Vehicle Exhaust Emissions Assessment Methodology

1.3.1 The following sections provide information on the traffic data used in the assessment and selected human receptors in accordance with the Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) guidance on land-use planning and development control: Planning for air quality (EPUK and IAQM, 2017).

Traffic data

1.3.2 The construction traffic data provided represents the 'baseline' scenario and the 'baseline with Project' scenario for the peak construction year 2036, the change in AADT of HGVs and LDVs has been calculated to define the ARN, as presented in Table 1.6. All these roads were screened in as the change in AADTs meet the screening threshold set out in the EPUK & IAQM land-use and planning guidance (EPUK and IAQM, 2017).

Table 1.6 Construction traffic data of the ARN

Traffic ID	Road Name	AQMA	Speed (km/h)	Baseline 2036 (AADT)		Baseline 2036 + Project (AADT)		Change in AADT	
				LDVs	HGVs	LDVs	HGVs	LDVs	HGVs
A27	A34 north	No	51	52,675	4,267	53,269	4,434	595	167
A28	A34 middle	No	104	62,662	4,686	63,333	4,811	670	125
A29	A34 south	No	103	43,771	4,622	44,506	4,733	735	111
A30	Frilford Rd	Yes	105	14,359	473	14,621	473	261	0
A31	A415 Marcham Rd	No	64	15,544	437	16,688	637	1,144	200
A32	A415 Marcham Rd	No	81	24,428	565	25,571	766	1,144	200
Z1	Site access / Construction trips (Compound A1)	No	97	0	0	1,126	200	595	167
X	A34 north, between A423 and A44	No	51	80,796	80,488	9,522	9,355	308	167

1.3.3 The operational traffic data provided represents the 'baseline' scenario and the 'baseline with Project' scenario for the opening year 2043, the change in AADT of HGVs and LDVs has been calculated to define the ARN, as presented in Table 1.7. All these roads were screened in as the change in AADTs meet the screening threshold set out in the EPUK & IAQM land-use and planning guidance (EPUK and IAQM, 2017).

Table 1.7 Operational traffic data of the ARN

Traffic ID	Road Name	AQMA	Speed (km/h)	Baseline 2043 (AADT)		Baseline 2043 + Project (AADT)		Change in AADT	
				LDVs	HGVs	LDVs	HGVs	LDVs	HGVs
A15	B4017 High St	No	42	10772	432	11275	432	503	0
A26b	Hanney Rd	No	51	5438	237	5959	237	521	0
A27	A34 north	No	51	54,823	4,441	55,943	4,447	1,120	6

Traffic ID	Road Name	AQMA	Speed (km/h)	Baseline 2043 (AADT)		Baseline 2043 + Project (AADT)		Change in AADT	
				LDVs	HGVs	LDVs	HGVs	LDVs	HGVs
A28	A34 middle	No	104	65,218	4,877	66,566	4,883	1,347	6
A29	A34 south	No	103	45,557	4,810	46,885	4,816	1,328	6
A30	Frilford Rd	Yes	105	14,945	492	15,296	492	351	0
A31	A415 Marcham Rd	No	64	16,178	455	18,276	469	2,098	14
A32	A415 Marcham Rd	No	81	25,424	588	27,523	603	2,098	14
Z1	Site Acess / Construction trips (Compound A1)	No	97	0	0	2,449	14	2,449	14
Z6	Southern site access	No	32	0	0	609	0	609	0

Human receptors

1.3.4 For each road that meets the screening thresholds during construction and operation, the nearest sensitive receptors located within the defined ARN were identified, as presented in Table 1.8. These locations are considered to represent the worst-case exposure to the vehicle exhaust emissions. Receptors further away are expected to experience lower exposure and are not included in the assessment.

Table 1.8 Human receptors within the ARN

Receptor ID	OS grid reference (m)		Receptor type	Receptor name	Nearest distance to ARN (m)
	X	Y			
H01	447223	191816	Residential	27B High Street, Steventon	6.5
H02	447028	192013	Residential	1 the Green	12.3
H03	449877	199785	Residential	22 Crane Avene	52.5
H04	447508	193422	Residential	97 Steventon Road	106.7
H05	448724	190945	Residential	28 Mackenzie Avenue	48.4
H06 [1]	445108	196576	Residential	50 Frilford Road	7.8
H07	446932	196956	Pedestrian/Cycle link	A415 Marcham Rd	/
H08	447654	196982	Commercial	Marcham Road north	31.4
H09	447351	196577	Pedestrian/Cycle link	Site Access / Construction trips (Compound A1)	/
H10	448889	205771	Residential	98 Westminster Way	21.2
H11	444204	193407	Pedestrian/Cycle link	Southern site access	/

[1] Receptor is located within the Marcham AQAM.
"/" indicates the receptor is located at the kerbside/pavement of the road, so distance to the road is not measured.

1.4 Odour Assessment Methodology

1.4.1 Following the identification of the source odour potential and pathway effectiveness detailed in Table 13.5 of Chapter 13: Air quality (IAQM, 2018), the risk of odour (impact) is determined by the matrix presented in Table 1.9.

Table 1.9 Risk of odour exposure (impact) at a specific receptor location

Pathway effectiveness	Source odour potential		
	Low	Moderate	High
Highly effective	Low risk	Medium risk	High risk
Moderately effective	Negligible	Low risk	Medium risk
Ineffective	Negligible	Negligible	Low risk

1.4.2 The likely magnitude of the odour effect is determined by the matrix in Table 1.10 in which accounts for the impact risk of odour exposure (presented in Table 1.9) and the corresponding receptor sensitivity.

Table 1.10 Likely magnitude of odour effect at a specific receptor location

Risk of odour exposure	Receptor sensitivity		
	Low	Moderate	High
High	Minor adverse	Moderate adverse	Major adverse
Medium	Negligible	Minor adverse	Moderate adverse
Low	Negligible	Negligible	Minor adverse
Negligible	Negligible	Negligible	Negligible

References

Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) (2017). Land-Use Planning & Development Control: Planning for Air Quality (Version 1.2). Accessed April 2025. https://iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

IAQM (2018). Guidance on the Assessment of Odour for Planning. Accessed April 2025. https://www.iaqm.co.uk/text/guidance/odour-guidance-2014.pdf

IAQM (2024). Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2). Accessed April 2025. https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf

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