

Llandyfaelog Substation Air Quality Assessment

On behalf of **National Grid**
nationalgrid

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Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU
Office Address: 10 Queen Square, Bristol, BS1 4NT
T: +44 (0)117 332 7840 E: bristolqueensquare@stantec.com

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	Name	Position	Signature	Date
Prepared by:	Jonny Dodkins	Assistant Air Quality Consultant	<i>JD</i>	October 2025
Reviewed by:	Phoebe Honan	Principal Air Quality Consultant	<i>PH</i>	October 2025
Approved by:				
For and on behalf of Stantec UK Limited				

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1 Introduction

1.1 Proposed Development

- 1.1.1 National Grid (the 'Applicant') has commissioned Stantec to undertake an air quality assessment to support the planning application for a 400kV substation on land north of Llandyfaelog, c.6km south of Carmarthen, South Wales (the 'Site'). The Site is located within the administrative boundary of Carmarthenshire County Council (CCC).
- 1.1.2 The Llandyfaelog Project is comprised of the following principal elements:
- Construction of a single level platform (260 metres by 640 metres) on which an Air Insulated Switchgear Substation (AIS) is sited measuring 155 metres by 602 metres
 - Bellmouth access to the A484 with an operational access road to connect the platform to the A484
 - Modification works to the existing 400kV Overhead Line (OHL) to connect the substation to the existing OHL involving the installation of two new towers (pylons) and one replacement tower (pylon) circa 18 metres and 62 metres

1.2 Scope of Assessment

- 1.2.1 This report describes existing air quality conditions and assesses the impact of the construction and operation of the Proposed Development on air quality in the study area, as defined by the methodology presented in Section 3 and outlined in Section 4.2. The Site itself is not considered sensitive to poor air quality due to the nature of the proposed end use.
- 1.2.2 The main air pollutants of concern related to construction are dust and fine particulate matter (PM₁₀) associated with on-site construction activities and off-site trackout. Additionally, there is the potential for emissions of nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}) from both construction and operational road traffic.
- 1.2.3 Given the infrequent usage (circa monthly testing) of the backup generators, potential emissions to air from them are not considered to have the potential to give rise to significant offsite impacts and have therefore not been assessed further.
- 1.2.4 The assessment has been prepared considering relevant local and national guidance, policy, and legislation.

2 Legislation, Policy, and Guidance

2.1 Air Quality Regulations

- 2.1.1 The Air Quality (Wales) Regulations 2000 (AQR) defined National Air Quality Objectives (NAQOs, a combination of concentration-based thresholds, averaging periods and compliance dates) for a limited range of pollutants. Subsequent amendments were made to the AQR in 2001 and 2002 to incorporate 'limit values' and 'target values' for a wider range of pollutants as defined in European Union (EU) Directives.
- 2.1.2 These amendments were consolidated by the Air Quality Standards (Wales) Regulations 2010 (AQSR) (with subsequent amendments most notably in 2016 and for the devolved administrations), which transposed the EU's Directive on ambient air quality and cleaner air for Europe (2008/50/EC).
- 2.1.3 Following the Transition Period after the UK's departure from the EU in January 2020, the Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (and subsequent amendments for the devolved administrations) have amended the Air Quality Standards Regulations 2010 to reflect the fact that the UK has left the EU.
- 2.1.4 The relevant NAQOs for this assessment are The Environment (Miscellaneous Amendments) (Wales) (EU Exit) Regulations 2020 shown in **Table 2-1**.

Table 2-1 Relevant Air Quality Objectives

Pollutant	Time Period	NAQOs	Source
NO ₂	1-hour mean	200 µg/m ³ not to be exceeded more than 18 times a year	NAQO and AQSR limit value
	Annual mean	40 µg/m ³	NAQO and AQSR limit value
PM ₁₀	24-hour mean	50 µg/m ³ not to be exceeded more than 35 times a year	NAQO and AQSR limit value
	Annual mean	40 µg/m ³	NAQO and AQSR limit value
PM _{2.5}	Annual mean	25 µg/m ³	AQSR limit value

- 2.1.5 The NAQO's for NO₂ and PM₁₀ required achievement by 2005 and 2004 respectively, but also continue to apply in all future years thereafter.
- 2.1.6 The 2019 Clean Air Strategy includes a commitment to set a *"new, ambitious, long-term target to reduce people's exposure to PM_{2.5}"* which the Environment Act 2021 commits the Secretary of State to setting (Statutory Instrument, 2021).
- 2.1.7 The Environment (Air Quality and Soundscapes) (Wales) Act 2024 contains a requirement for Ministers to set a PM_{2.5} target. The Clean Air Act (Wales) also required the Welsh government to:
- Provide a framework for setting national air quality targets and consider who guidelines,
 - amend existing legislation relating to the national air quality strategy

- local air quality management; smoke control; clean air zones/low emission zones and vehicle idling; and
- place a duty on Welsh Ministers to promote awareness of air pollution.

National Air Quality Plan for NO₂ in the UK

- 2.1.8 The national Air Quality Plan for NO₂ (DEFRA, 2018) sets out how the Government plans to deliver reductions in NO₂ throughout the UK, with a focus on reducing concentrations to below the EU Limit Values throughout the UK within the 'shortest possible time'.
- 2.1.9 The Plan requires all local authorities which DEFRA identified as having exceedances of the limit values in their areas past 2020 to develop local plans to improve air quality and identify measures to deliver reduced emissions, with the aim of meeting the limit values within their area within "*the shortest time possible*". Potential measures include changing road layouts, encouraging public and private ultra-low emission vehicle (ULEV) uptake, the use of retrofitting technologies and new fuels and encouraging public transport. In cases where these measures are not sufficient to bring about the required change within 'the shortest time possible' then local authorities may consider implementing access restrictions on more polluting vehicles (e.g. Clean Air Zones (CAZs)).

Tackling Roadside Nitrogen Dioxide Concentrations in Wales

- 2.1.10 The Welsh Supplemental Plan to the 'UK plan for tackling roadside nitrogen dioxide concentrations 2017' (Welsh Government, 2018) sets out work that has been, and continues to be done to identify how Wales will reduce concentrations of NO₂ around roads where levels are above legal limits in the "*shortest time possible*".

Clean Air Plan for Wales: Healthy Air, Healthy Wales 2020

- 2.1.11 The aim of the Clean Air Plan for Wales is to improve air quality and reduce the impacts of air pollution on human health, biodiversity, the natural environment and the economy. The Plan sets out a 10-year pathway to achieving cleaner air. The Plan is structured around four core themes, with actions to enable collaborative approaches to reducing air pollution:
- *'People: Protecting the health and well-being of current and future generations.'*
 - *'Environment: Taking action to support our natural environment, ecosystems and biodiversity.'*
 - *'Prosperity: Working with industry to reduce emissions, supporting a cleaner and more prosperous Wales.'*
 - *'Place: Creating sustainable places through better planning, infrastructure and transport.'*

Well-being of Future Generations Act

- 2.1.12 The Well-being of Future Generations Act (Welsh Government, 2015) requires public bodies in Wales to consider the long-term impact of their decisions, to collaborate with people, communities and each other, and to prevent persistent problems such as poverty, health inequalities and climate change. Under the Well-being of Future Generations Act, the Welsh government has established average population exposure to NO₂ as an indicator to measure progress towards well-being goals in Wales. Regulations made under the Act require public services boards to consider air quality when carrying out their statutory assessments of local well-being.

2.2 Air Quality Management

The Air Quality Strategy

- 2.2.1 Part IV of the Environment Act 1995 (Environment Act, 1995) required the Secretary of State to prepare and publish and 'strategy' regarding air quality.
- 2.2.2 The Air Quality Strategy (2007) establishes the policy framework for ambient air quality management and assessment in the UK (DEFRA, 2007). The primary objective of the Air Quality Strategy is to ensure that everyone can enjoy a level of ambient air quality which poses no significant risk to health or quality of life. The Air Quality Strategy sets out the NAQOs and Government policy on achieving these.
- 2.2.3 The Clean Air Strategy (2019) aims to lower national emissions of pollutants, thereby reducing background pollution and minimising human exposure to harmful concentrations of pollution. The Strategy aims to create a stronger and more coherent framework for action to tackle air pollution (DEFRA, 2019).

Local Air Quality Management

- 2.2.4 Part IV of the Environment Act 1995 (Environment Act, 1995) introduced a system of Local Air Quality Management (LAQM) which requires local authorities to regularly and systematically review and assess air quality within their boundary and appraise development and transport plans against these assessments.
- 2.2.5 Where a NAQO is unlikely to be met, the local authority must designate an Air Quality Management Area (AQMA) and draw up an Air Quality Action Plan (AQAP) setting out the measures it intends to introduce in pursuit of the NAQOs within its AQMA.
- 2.2.6 The Local Air Quality Management Technical Guidance 2022 (LAQM.TG(22); DEFRA, 2025), issued by the Department for Environment, Food and Rural Affairs (DEFRA) for local authorities provides advice on where the NAQOs apply. These include outdoor locations where members of the public are likely to be regularly present for the averaging period of the objective (which vary from 15 minutes to a year) as summarised in **Table 2-2**.

Table 2-2 Relevant Public Exposure

Averaging Period	NAQOs should apply at:	NAQOs don't apply at:
Annual mean	All locations where members of the public might be regularly exposed For example: Building façades of residential properties, schools, hospitals, care homes etc	Façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residences Kerbside sites Any other location where public exposure is expected to be short term
24-hour mean and 8-hour mean	All locations where the annual mean NAQO would apply, together with hotels and gardens of residences	Kerbside sites Any other location where public exposure is expected to be short term

1-hour mean	All locations where the annual mean and 24 and 8-hour mean NAQOs apply as well as: Kerbside sites Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside locations where the public would not be expected to have regular access
15-minute mean	All locations where members of the public might reasonably be regularly exposed for a period of 15 minutes or longer.	

2.3 Planning Policy

National Planning Policy

Planning Policy Wales

- 2.3.1 Planning Policy Wales (PPW) (Welsh Government, 2024) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales.
- 2.3.2 Paragraph 1.2 states that *“the primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales...”*
- 2.3.3 Chapter 6 provides specific guidance on air quality within Section 6.7 Air Quality and Soundscape. Paragraph 6.7.6 states that:

“In proposing new development, planning authorities and developers must, therefore:

- address any implication arising as a result of its association with, or location within, air quality management areas...*
- not create areas of poor air quality or inappropriate soundscape; and*
- seek to incorporate measures which reduce overall exposure to air and noise pollution...”*

Future Wales: the National Plan 2040

- 2.3.4 Future Wales: the national plan 2040 (Welsh Government, 2021) was published in February 2021 by the Welsh government. This document forms part of the national development framework for Wales and promotes development that enhances wellbeing and quality of life. The document should be read in conjunction with Planning Policy Wales and planning applications will need comply with the plan. Air quality and clean air is referenced throughout the document, in particular developing infrastructure responsibly.

Technical Advice Note 18: Transport

- 2.3.5 TAN 18 was adopted in March 2007 (Welsh Government, 2007) and should be read in conjunction with PPW. There are no policies within the TAN 18 that relate directly to air quality.

However, TAN states that “*transport emissions contribute significantly to climate change and poor air quality*” and when “*considering planning applications, planning authorities should take into account statutory air quality objectives, together with the results of air quality reviews and assessments and any Air Quality Management Area Action Plans that may have been prepared.*”

Local Planning Policy

Carmarthenshire County Council Local Development Plan 2006 - 2021

- 2.3.6 The Carmarthenshire Local Development Plan (LDP) (Carmarthenshire County Council, 2014) was adopted on the 10th December 2014. The LDP sets out the spatial vision for the future of Carmarthenshire (excluding the area within the Brecon Beacons National Park) and a framework for the distribution and delivery of growth and development.
- 2.3.7 It sets out land-use planning policies and proposals which are used in the determination of planning applications and in guiding future opportunities for investment and growth. These policies include land-use allocations for different types of development (i.e. housing, employment, retailing, education, open space etc.) as well as criteria for assessing individual proposals. Policy EP2 Pollution states:

“Proposals for development should wherever possible seek to minimise the impacts of pollution. New developments will be required to demonstrate that they:

- a. Do not conflict with National Air Quality Strategy objectives, or adversely affect to a significant extent, designated Air Quality Management Areas (permitted developments may be conditioned to abide by best practice)...”*

Carmarthenshire County Council's Carmarthen and Llanelli Air Quality Action Plan

- 2.3.8 CCC has produced an Air Quality Action Plan (AQAP) (Carmarthenshire County Council, 2019) as part of its statutory duties under the LAQM framework. It outlines actions to improve air quality within the towns of Llanelli and Carmarthen. Measures are considered under nine broad topics:
- Alternatives to private vehicle use.
 - Freight and delivery management.
 - Policy guidance and development control.
 - Promoting low emission transport.
 - Promoting travel alternatives.
 - Public information.
 - Transport planning and infrastructure.
 - Traffic management.
 - Vehicle fleet efficiency.

2.4 Assessment Guidance

- 2.4.1 The primary guidance documents used in undertaking this assessment are detailed below.

DEFRA 'Local Air Quality Management Technical Guidance (LAQM.TG (22))'

- 2.4.2 DEFRA LAQM.TG(22) was published for use by local authorities in their LAQM review and assessment work (DEFRA, 2025). The document provides key guidance on aspects of air quality assessment, including screening, use of monitoring data, and use of background data that are applicable to all air quality assessments.

EPUK-IAQM 'Land-Use Planning & Development Control: Planning for Air Quality'

- 2.4.3 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) have together published guidance to help ensure that air quality is properly accounted for in the development control process (EPUK / IAQM 2017). It clarifies when an air quality assessment should be undertaken, what it should contain, and how impacts should be described and assessed including guidelines for assessing the significance of impacts.

IAQM 'Guidance on the Assessment of Dust from Demolition and Construction'

- 2.4.4 Guidance on the assessment of dust from demolition and construction has been published by the IAQM (IAQM, 2024). The guidance provides a series of matrices to determine the risk magnitude of potential dust sources associated with construction activities in order to identify appropriate mitigation measures that are defined within further IAQM guidance.
- 2.4.5 Within the IAQM guidance, an 'impact' is described as a change in pollutant concentrations or dust deposition and an 'effect' is described as the consequence of an impact.

3 Methodology

3.1 Introduction

- 3.1.1 The assessment methodology detailed in the following sections has been applied to ascertain the potential impacts of emissions to air in order to identify their significance and compliance with policy and regulatory requirements (outlined in **Section 2** of this report), and whether or not additional mitigation is required.
- 3.1.2 This assessment first outlines the existing air quality within the study area, then considers the impact of construction and operational activities on air quality and sensitive receptors in the study area.

3.2 Baseline Air Quality

- 3.2.1 Any exceedances of the limit values along roads within the study area have been identified using the 2020 NO₂ Projections Data published by DEFRA (DEFRA, 2020a). Information on baseline air quality in the study area has been obtained by collating the results of monitoring carried out by CCC and their LAQM reports to identify potential AQMAs. Background concentrations for the study area have been defined using the national pollution maps published by DEFRA which cover the whole country on a 1x1 km grid (DEFRA, 2024b).

3.3 Construction Dust Impacts

- 3.3.1 During demolition and construction, dust from on-site activities and off-site trackout by construction vehicles has the potential to impact on sensitive human receptors within the study area. The main potential impacts are loss of amenity (as a result of dust soiling) and deterioration of human health (as a result of concentrations of PM₁₀).
- 3.3.2 The suspension of particles in the air is dependent on surface characteristics, weather conditions and on-site activities. Impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive receptors are located downwind of the dust source(s).
- 3.3.3 Separation distance is also an important factor. Large dust particles (greater than 30 µm), can be potentially responsible for most dust annoyance, will largely deposit within 100 m of sources. Intermediate particles (10-30 µm) can travel 200-500 m. Consequently, significant dust annoyance is usually limited to within a few hundred metres of its source. Smaller particles (less than 10 µm), which are the predominant fraction that can be potentially responsible for human health impacts largely remain airborne. However, the impact on the short-term concentrations of PM₁₀ occurs over a shorter distance due to the rapid decrease in concentrations with distance from the source due to dispersion.
- 3.3.4 The assessment of the risk of potential construction dust impacts has been undertaken with reference to relevant guidance (IAQM, 2024). The assessment methodology considers three separate potential dust impacts:
- ▮ loss of amenity due to dust soiling;
 - ▮ human health effects due to increases in concentrations of PM₁₀; and
 - ▮ harm to ecological receptors due to increased dust deposition.

Screening Assessment

- 3.3.5 The first stage involves a screening assessment to determine if there are sensitive receptors within threshold distances of the activities associated with the construction phase of a scheme; defined as the study area. No further assessment is required if there are no receptors within the study area.
- 3.3.6 The IAQM guidance outlines that further assessment is only required in cases where:
- ▮ A 'human receptor' is located within:
 - 250 m of the boundary of the Site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the Site entrance(s).
 - ▮ An 'ecological receptor' is located within:
 - 50 m of the boundary of the Site; or
 - 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the Site entrance(s).

Further Assessment

- 3.3.7 The dust emission class (or magnitude) for each activity, receptor sensitivity and the overall sensitivity of the area are determined using the criteria outlined in **Table B-1** to **Table B-4** in **Appendix B** (based on the IAQM guidance), indicative thresholds and professional judgement. The risk of dust impacts arising is a product of the relationship between the dust emission magnitude and the area sensitivity and is based on the criteria outlined in **Table B-6** (based on the IAQM guidance). The risk of impact is then used to determine the mitigation requirements.
- 3.3.8 The IAQM guidance recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations.
- 3.3.9 With appropriate mitigation in place, the IAQM guidance indicates that the residual effect dust emissions associated with the demolition and construction can be classified as being 'not significant'.

3.4 Construction Road Traffic Emission Impacts

- 3.4.1 The potential for a significant overall effect on existing sensitive receptors within the study area as a result of emissions from construction road traffic generated by the Proposed Development has been determined qualitatively, taking into consideration the screening criteria outlined in the EPUK / IAQM guidance (EPUK / IAQM, 2017) (see **Appendix C**), the anticipated routing of the generated traffic and the anticipated duration of impacts associated with the generated traffic.

3.5 Operational Road Traffic Emission Impacts

- 3.5.1 The potential for significant impacts on existing sensitive receptors within the study area as a result of emissions from traffic generated by the Proposed Development during its operation is determined quantitatively and is based on the screening criteria outlined in the EPUK / IAQM Guidance (EPUK / IAQM, 2017) (see **Appendix C**) which includes consideration of the volume and composition of traffic generated by the Proposed Development and existing local air quality conditions (i.e. the presence of any declared AQMAs). It should be noted that if traffic from a development exceeds these levels, then it does not necessarily mean that a modelling

assessment is necessary, only that the air quality impacts of traffic require more detailed consideration.

- 3.5.2 Information on the Proposed Development's trip generation has been provided by the Project's transport consultants, Stantec. Operational road traffic impacts are discussed in Section 6.2.

4 Baseline Environment

4.1 Site Context

- 4.1.1 The Site is approximately 4 km south of Carmarthen and directly north of Llandyfaelog. The Site comprises a number of roads, residences and agricultural fields, many of which are bounded by hedgerows, with occasional hedgerow trees. The Site is broadly surrounded by agricultural fields of a similar vein.

4.2 Study Area

- 4.2.1 The study area adopted for this assessment is as follows:
- ▮ for the construction phase assessment, the study area (based on IAQM, 2024 guidance) is defined as up to 250 m from the Site or 50 m from the route of construction vehicles (up to 250m from the site entrance).
 - ▮ for the operational phase assessment, the study area (based on EPUK / IAQM, 2017 guidance) is defined as all roads within 250 m of the Site and any other roads which could potentially exceed the screening criteria outlined in **Appendix C**.

4.3 Ambient Air Quality

Limit Values

- 4.3.1 The study area does not contain any predicted or measured exceedances of a limit values.

LAQM

- 4.3.2 CCC has investigated air quality within its area as part of its responsibilities under the LAQM regime. CCC has declared three Air Quality Management Areas (AQMA) due to exceedances of the annual mean NO₂ NAQO. The Site is not located within an AQMA, the nearest AQMA is approximately 4.5 km north of the Site and encompasses an area within Carmarthen town centre.

Local Monitoring Data

NO₂

- 4.3.3 CCC does not undertake automatic monitoring within its administrative area, however it does undertake monitoring using NO₂ diffusion tubes at 93 locations. The closest diffusion tube monitoring location to the Site, Carm/142, is located approximately 4 km north on Llansteffan Road. The closest monitoring locations to the Site with representative data over the monitoring period are described in **Table 4-1** and their locations are shown in **Figure 4-1** below.

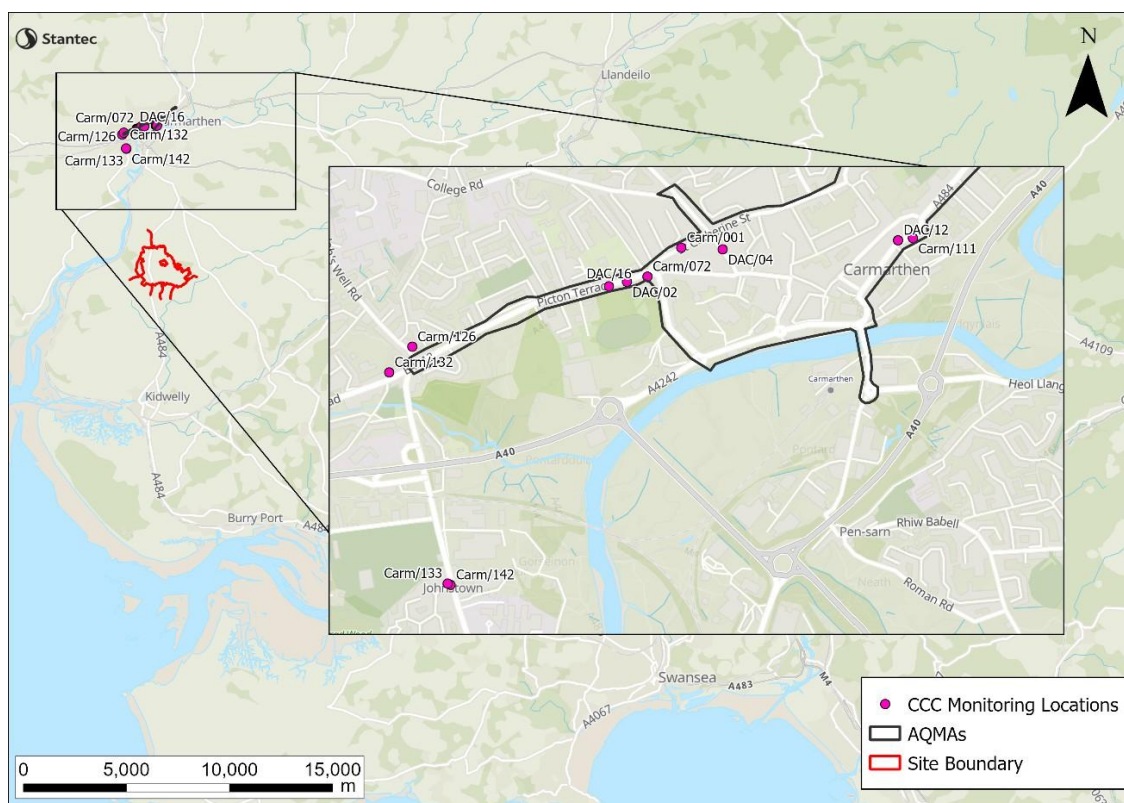


Figure 4-1 Monitoring Locations in the vicinity of the Site. Contains OS Data © Crown Copyright and Database rights 2025. Contains data from OS Zoomstack.

Table 4-1 Measured Annual Mean NO₂ Concentrations 2019 - 2023

Site ID	Site Type	Within AQMA	Annual Mean (µg/m ³)				
			2019	2020	2021	2022	2023
Carm/142	Roadside	No	15	12	13	-	-
Carm/133	Roadside/Façade	No	13	9	11	-	-
Carm/132	Roadside/Façade	No	16	12	14	12	11
Carm/126	Roadside	No	20	16	17	16	15
DAC/16	Roadside/Façade	Yes - Carmarthen	33	26	29	28	27
DAC/02	Kerbside	Yes - Carmarthen	40	30	32	31	29
Carm/072	Roadside	Yes - Carmarthen	28	23	23	23	22
DAC/12	Roadside/Façade	Yes - Carmarthen	30	20	24	22	24
Carm/111	Roadside	Yes - Carmarthen	29	21	21	22	20
DAC/04	Kerbside/Façade	Yes - Carmarthen	21	16	16	15	14
Carm/001	Roadside	Yes - Carmarthen	28	22	23	22	20
NAQO			40				

Exceedances highlighted in bold.

2019 - 2023 data taken from the CCC 2020 Air Quality Annual Status Report (CCC, 2020) and CCC Website (CCC, 2025).

- 4.3.4 All monitoring locations in the vicinity of the Site have been below the annual mean NO₂ objective since 2020. Furthermore, all concentrations have been below 60 µg/m³, indicating that it is unlikely there have been any exceedances of the 1-hour NO₂ NAQO at these locations (DEFRA, 2025).

PM₁₀ and PM_{2.5}

- 4.3.5 CCC do not undertake PM₁₀ or PM_{2.5} monitoring within their administrative boundary.

Predicted Background Concentrations

- 4.3.6 Estimated background concentrations for the Site have been obtained from the latest 2021-based national maps provided by DEFRA (DEFRA, 2024b) and are provided in **Table 4-2**.

- 4.3.7 The background concentrations are all well below the relevant NAQOs.

Table 4-2 Estimated Annual Mean Background Concentrations

Year	Location	Annual Mean (µg/m ³)		
		NO ₂	PM ₁₀	PM _{2.5}
2025	241_213	2.5	8.6	4.9
NAQOs		40	40	25

5 Predicted Impacts

5.1 Construction Dust Impacts

Screening Assessment

- 5.1.1 There are existing sensitive human receptors (i.e residential properties) located within 250m of the Site boundary and within 50 m of the routes that will be used by demolition and construction vehicles. As such, further assessment of the risk of dust soiling and PM₁₀ emissions is required.
- 5.1.2 There are a number of ecological sites located within 20 m of the site boundary and within 20 m of roads within the Site along which material could be tracked. There are a number of ecological sites within and adjacent to the Site. As such, further assessment of the risk to ecological sites is required.

Further Assessment

Dust Emission Magnitude

- 5.1.3 The dust emissions magnitude of demolition, earthworks, construction activities, and as a result of trackout have been determined in **Table 5-1** below based the criteria shown in **Table B-1, Appendix B**.

Table 5-1: Dust Emissions Magnitudes

Activity	Magnitude	Justification
Demolition	N/A	No demolition activities proposed.
Earthworks	Large	Proposed earthworks activities comprise clearance of vegetation, soil preparation and landscaping across an area greater than 110,000 m ² . The soil at the Site is largely classified as slowly permeable loamy and clayey soils (British Geological Survey, 2025) which are considered to be moderately dusty, particularly during periods of dry weather. Based on this, the dust emission magnitude of earthworks activities is judged to be 'large'.
Construction	Small	The total building volume to be constructed is expected to be less than 12,000 m ³ . Construction materials will comprise a mixture of masonry material including those with a high potential for dust release, such as concrete, as well as those with a lower dust potential such as metals. Based on this, the dust emission magnitude of construction activities is judged to be 'small'.
Trackout	Medium	The number of HDVs that will exit the Site will vary depending upon the processes occurring at any one time. There are not expected to be more than 20 outward HDV movements in any one day. Due to the nature of the Site, there could be an unpaved road length greater than 100 m in length comprising moderately dusty surface material. Based on this, the dust emission magnitude of trackout is judged to be 'medium'.

Area Sensitivity

- 5.1.4 The area sensitivity to dust soiling and human health impacts has been determined based on the criteria shown in **Appendix B**. The IAQM demolition and construction band criteria used to determine the sensitivity of the local area is shown in **Figure 5-1** below.

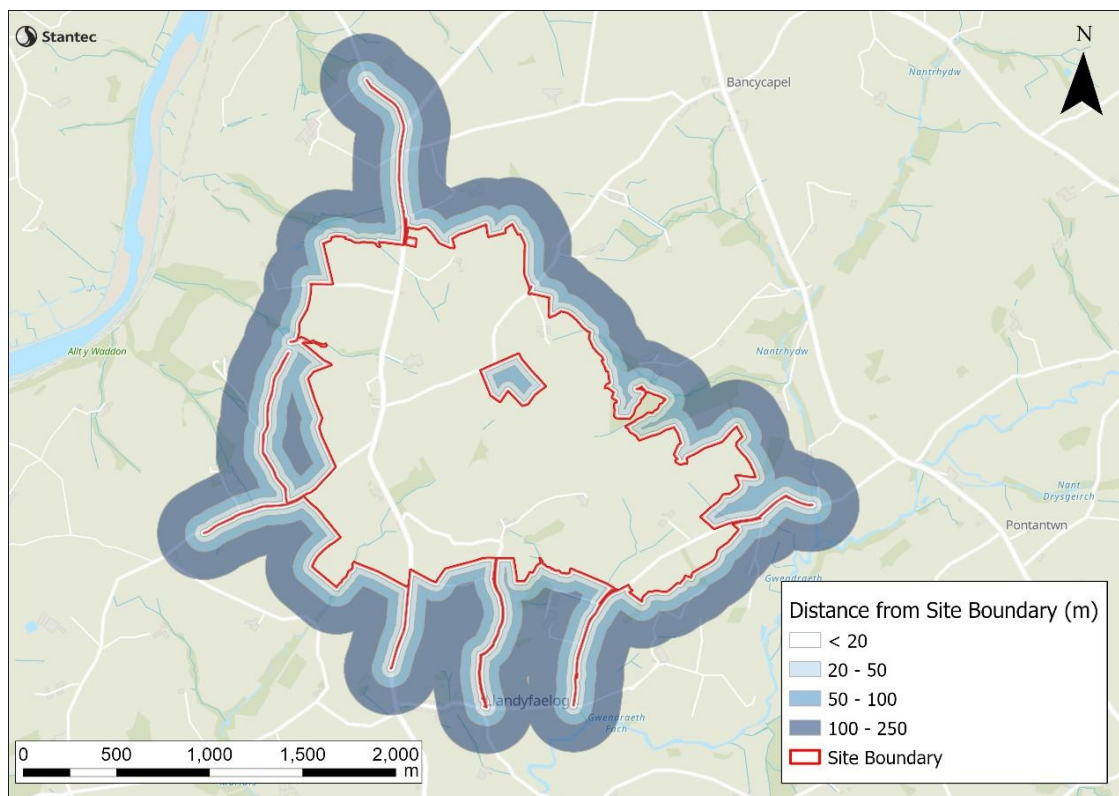


Figure 5-1: IAQM Construction Dust Band Criteria from the Site boundary. Contains OS Data © Crown Copyright and Database rights 2023. Contains data from OS Zoomstack.

- 5.1.5 Residential properties are classed as 'high sensitivity' receptors to human health impacts as well as dust soiling, based on the IAQM guidance (IAQM, 2024) (see **Appendix B**). There are over ten residential properties located within, or within 20 m of the Site boundary. As such, the sensitivity of the area surrounding the Site to human health impacts and dust soiling is judged to be 'high'.
- 5.1.6 The IAQM guidance states that trackout may occur for distance of up to 250m from the Site entrances. There are over ten residential properties within 20 m of the roads within 250m of the Site. As such, the sensitivity to dust soiling of the area surrounding roads along which material may be tracked is judged to be 'high'.
- 5.1.7 The IAQM also defines residential properties as being 'high sensitivity' receptors to human health impacts (see **Table B-4, Appendix B**). PM₁₀ concentrations at existing residential properties within the study area are anticipated to be similar to the maximum of the DEFRA-predicted 2025 PM₁₀ concentrations at the Site (8.6 µg/m³). Based on the predicted existing PM₁₀ concentrations and the number of sensitive receptors within 20 m of the Site and roads along which material may be tracked, the sensitivity to human health impacts of the areas surrounding the Site and the area surrounding roads along which material may be tracked are judged to be 'low'.
- 5.1.8 Ancient Woodland designations with dust sensitive features are classed as being 'medium sensitivity' receptors to dust deposition, based on the IAQM guidance (see **Table B-5**,

Appendix B). There are a number of Ancient Woodland designations located within the Site and adjacent to the Site boundary, and within 20 m of roads along which material could be tracked. As such, the ecological sensitivity of the area surrounding the Site, and areas surrounding roads along which material may be tracked, are judged to be 'medium'.

Risk of Impacts

- 5.1.9 The risk of construction dust impacts, without mitigation, have been defined based on the criterion shown in **Table B-6, Appendix B**, and are presented in **Table 5-2**.

Table 5-2 Risk of Construction Dust Impacts without Mitigation

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

5.2 Construction Traffic Emission Impacts

- 5.2.1 During the construction phase, the increase in heavy duty vehicles (HDVs) movements on the road network will be below the threshold of 100 movements per day outside an AQMA for a detailed assessment to be necessary according to EPUK and IAQM guidance (EPUK / IAQM, 2017). Predicted baseline concentrations in the area are also well below the NAQOs and therefore this level of additional HDV movements is unlikely to have a significant effect on local air quality.

5.3 Operational Road Traffic Emission Impacts

- 5.3.1 During operation, the Proposed Development is not anticipated to generate significant traffic as access will only be required for inspection and maintenance. As such, traffic generated by the Proposed Development falls below the EPUK / IAQM screening criteria (see **Appendix C**) and the impacts of operational traffic generated by the Proposed Development on existing sensitive receptors within the study area can be screened. On this basis impacts are considered to be 'not significant and no additional mitigation is required.

6 Mitigation

6.1 Construction

- 6.1.1 The following standard mitigation measures from the IAQM guidance (IAQM, 2024) are recommended, considering the outcomes of the construction dust risk assessment (presented in **Table 5-1**). The mitigation measures will be incorporated into the Construction Environment Management Plan (CEMP).
- 6.1.1 Furthermore, in accordance with Part 4 of the IAQM demolition and construction guidance, all NRMM will need to adhere to the relevant NRMM emissions standards for NO₂ and PM₁₀. These measures will be implemented through a CEMP secured by a suitably worded planning condition on any permission.
- 6.1.2 It is understood that a Construction Traffic Management Plan will be developed for the construction of the substation. It will identify measures to mitigate the impact of construction vehicle movements on the highway network and sensitive receptors, including residential properties.

Table 6-1 Construction Phase Mitigation Measures

Category	Mitigation Measure
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
	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.
Management	Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real time PM ₁₀ continuous monitoring and/or visual inspections.
	Record all dust and air quality complaints, identify cause(s) and 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- of off-site, and the action taken to resolve the situation in the log book.
	Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.
Monitoring	Undertake daily on-site and off-site inspections, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary, with cleaning to be provided if necessary.

Category	Mitigation Measure
	Carry out regular site inspections to monitor compliance with the DMP, 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 local authority. Where possible, commence baseline monitoring at least three months before work on a phase commences.
Preparing and maintaining the site	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.
	Fully enclose site or specific operations where there is a high potential for dust productions 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 vehicle/machinery and sustainable travel	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 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).
	Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
	Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car sharing).
Operations	Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
	Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
	Use enclosed chutes and conveyors and covered skips.

Category	Mitigation Measure
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
	Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste management	No bonfires and burning of waste materials.
Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise 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 the cover in small areas during work and not all at once.
Construction	Avoid scabbling (roughening of concrete surfaces) if possible.
	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
Trackout	Use water assisted dust sweepers on the site access and local roads, to remove, as necessary, any material trackout out of the site. This may require the sweeper being continuously in use.
	Avoid dry sweeping of large areas.
	Ensure vehicles entering and leaving the site are covered to prevent 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 any subsequent action in a 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 a 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.

6.2 Operation

- 6.2.1 Road traffic emission impacts on local air quality during the construction phase have been assessed as being 'not significant' and therefore no further mitigation is required.

7 Summary and Conclusions

- 7.1.1 The air quality impacts associated with the Proposed Development of a 400kV substation have been assessed.
- 7.1.2 Carmarthenshire County Council has declared three AQMAs due to exceedances of the annual mean NO₂ objective. The Site is not located within the AQMA; the closest AQMA to the Site is the Carmarthen AQMA, approximately 4.5 km north of the Site.
- 7.1.3 The construction activities have the potential to create dust. During construction it is recommended that in accordance with the IAQM guidance a package of mitigation measures is put in place to minimise the risk of elevated PM₁₀ concentrations and dust soiling in the surrounding area. With mitigation in place the construction impacts are judged as being 'not significant'.
- 7.1.4 The increase in road traffic resulting from the Development is below the EPUK / IAQM screening criteria during both the construction and operational phases. Therefore, the air quality impacts of the Development, with regards to road traffic emissions, are considered to be 'not significant' and additional mitigation is not required.
- 7.1.5 The Proposed Development is therefore considered to be in accordance with the requirements of the planning policy, and relevant local and national guidance regarding air quality.

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Appendix A Glossary

Abbreviations	Meaning
AADT	Annual Average Daily Traffic
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
CAZ	Clean Air Zone
CCC	Carmarthenshire County Council
CEMP	Construction Environmental Management Plan
DEFRA	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
Diffusion Tube	A passive sampler used for collecting NO ₂ in the air
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle; a vehicle with a gross vehicle weight greater than 3.5 tonnes. Includes Heavy Goods Vehicles and buses
IAQM	Institute of Air Quality Management
LA	Local Authority
LAQM	Local Air Quality Management
NAQO	National Air Quality Objective as set out in the Air Quality Strategy and the Air Quality Regulations
NO ₂	Nitrogen Dioxide
NO _x	Oxides of nitrogen generally considered to be nitric oxide and NO ₂ . Its main source is from combustion of fossil fuels, including petrol and diesel used in road vehicles
PM ₁₀ /PM _{2.5}	Small airborne particles less than 10/2.5 µm in diameter
Receptor	A location where the effects of pollution may occur

Appendix B IAQM Dust Guidance (2024) Approach

Table B-1 Dust Emission Magnitude Classification

Activity	Dust Emission Magnitude		
	Large	Medium	Small
Demolition	Total building volume of >75,000 m ³ , potentially dusty construction material, on-site crushing and screening, demolition activities >12 m above ground	Total building volume of 12,000 – 75,000 m ³ , potentially dusty construction material, demolition activities 6 – 12 m above ground level	Total building volume of <12,000 m ³ , construction material with low potential for dust release, demolition activities <6 m above ground, demolition during wetter months
Earthworks	Total site area of >110,000 m ² , potentially dusty soil type, >10 heavy earth moving vehicles active at any one time, formation of bunds >6 m in height	Total site area of 18,000 – 110,000 m ² , moderately dusty soil type, 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 3 - 6 m in height	Total site area of <18,000 m ² , soil type with large grain size, <5 heavy earth moving vehicles active at any one time, formation of bunds <3 m in height
Construction	Total building volume >75,000 m ³ , on-site concrete batching, sandblasting	Total building volume 12,000 - 75,000 m ³ , potentially dusty construction material, on-site concrete batching	Total building volume <12,000 m ³ , construction material with low potential for dust release
Trackout	>50 HDV outwards movements in any one day, potentially dusty surface material, unpaved road length >100 m	20 - 50 HDV outwards movements in any one day, moderately dusty surface material, unpaved road length 50 - 100 m	<20 HDV outwards movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

Table B-2 Receptor Sensitivity

Receptor Sensitivity	Impact		
	High	Medium	Low
High	An area where: - Users can reasonably expect enjoyment of a high level of amenity; - The appearance, aesthetics of 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 PM₁₀ (in the case of the 24-hour objective, a relevant location would be one where individuals may be exposed for eight hours or more per 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 <i>and</i> the designated features may be affected by dust soiling; OR Locations where there is a community of particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain. Indicative examples include a 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	An area where: - Users would expect to enjoy of a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; - The appearance, aesthetics of 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 people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM₁₀ (in the case of the 24-hour objective, a relevant location would be one where individuals may be exposed for eight hours or more per day). Examples include office and shop workers, but will generally not include workers occupationally exposed to for PM₁₀, 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; OR Locations with a national designation where the features may be affected by dust deposition. Indicative example is a SSSI with dust sensitive features.

Low	An area where: - 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. Examples include public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. Indicative example is a LNR with dust sensitive features.
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Table B-3 Sensitivity of an Area to Dust Soiling Effects

Receptor Sensitivity	Number of Receptors	Distance from Source (m)			
		<20	<50	<100	<250
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 B-4 Sensitivity of an Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ Concentration	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32 µg/m ³	>100	High	High	High	Medium
		10 – 100	High	High	Medium	Low
		1 - 10	High	Medium	Low	Low
	28 - 32 µg/m ³	>100	High	High	Medium	Low
		10 – 100	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low
	24 - 28 µg/m ³	>100	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	<24 µg/m ³	>100	Medium	Low	Low	Low
		10 – 100	Low	Low	Low	Low

		1 - 10	Low	Low	Low	Low
Medium	>32 µg/m ³	>10	High	Medium	Low	Low
		1 - 10	Medium	Low	Low	Low
	28 - 32 µg/m ³	>10	Medium	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	24 - 28 µg/m ³	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
	<24 µg/m ³	>10	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Table B-5 Sensitivity of an Area to Ecological Impacts

Receptor Sensitivity	Distance from Source (m)	
	<20	<50
High	High Risk	Medium Risk
Medium	Medium Risk	Low Risk
Low	Low Risk	Low Risk

Table B-6 Risk of Dust Impacts Calculation Matrix

Sensitivity of Area		Dust Emission Magnitude		
		Large	Medium	Small
Demolition	High	High Risk	Medium Risk	Medium Risk
	Medium	High Risk	Medium Risk	Low Risk
	Low	Medium Risk	Low Risk	Negligible Risk
Earthworks	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible Risk
Construction	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible Risk
Trackout	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible Risk

Appendix C EPUK & IAQM Guidance (2017) Screening Criteria

The Development Will:	Indicative Criteria to Proceed to an Air Quality Assessment
Cause a significant change in LDV traffic flows on local roads with relevant receptors.	A change of LDV flow of: >100 AADT within or adjacent to an AQMA; and >500 AADT elsewhere.
Cause a significant change in HDV flows on local roads with relevant receptors.	A change of HDV flow of: >25 AADT within or adjacent to an AQMA; and >100 AADT elsewhere.
Realign roads i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5 m or more and the road is within an AQMA.
Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle acceleration / deceleration, e.g. traffic lights, or roundabouts.
Introduce or change a bus station.	A change of bus flows of: >25 AADT within or adjacent to an AQMA; and >100 AADT elsewhere.
Have an underground car park with extraction system.	The ventilation extract for the car park will be located within 20 m of a relevant receptor; and The car park will have >100 movements per day (total in and out).

The screening criteria presented is amended from Table 6.2 of the EPUK / IAQM guidance (EPUK / IAQM, 2017). Only the screening criteria relevant to changes in transport (including both traffic and the transport network) are outlined.