Air Quality Assessment:
South Dock, Alexandra Docks, Newport

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Experts in air quality management & assessment

Document Control

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Executive Summary

The air quality impacts associated with the proposed industrial development at South Dock, Alexandra Docks, Newport have been assessed. The proposals are for the construction of an industrial plant for the manufacture of cement substitute from recycled waste products.

A screening assessment of the emissions from the industrial plant has demonstrated that the air quality impacts of these emissions will be negligible.

The proposed development will generate additional traffic on the local road network, but the assessment has shown that there will be no significant effects at any existing human or ecological receptor.

The operational dust impacts of the proposed development have been assessed and the dust magnitude effects are found to be negligible at all human and ecological receptors.

During the construction works, a range of best practice mitigation measures will be implemented to reduce dust emissions and the overall effect will be 'not significant'; appropriate measures have been set out in this report, to be included in the Dust Management Plan for the works.

Overall, the construction and operational air quality effects of the proposed development at the South Dock are judged to be 'not significant' and thus no mitigation, beyond the good design and best practice measures, is required.

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1 Introduction

1.1 This report describes the potential air quality impacts associated with the proposed industrial development at the South Dock, Alexandra Docks, Newport, South Wales. The proposed development consists of the construction of an industrial plant for the manufacture of a cement substitute from recycled waste products. The proposed development is described as:

"The importation of cement and cement substitutes at south dock and construction and operation of a mill for processing, manufacture of cement and operation of mill for processing, manufacture of cement and cement substitutes and onward distribution".

1.2 The proposed development is within 160 m of the River Usk Special Area of Conservation (SAC)/Site of Special Scientific Interest (SSSI) and within 500 m of the River Severn Estuary Ramsar/Special Protection Area (SPA)/SSSI. In addition, the proposed development is within 3 km of the George Street Air Quality Management Area (AQMA). The location and setting of the proposed development is shown in Figure 1, along with the nearest AQMA and ecological receptors.

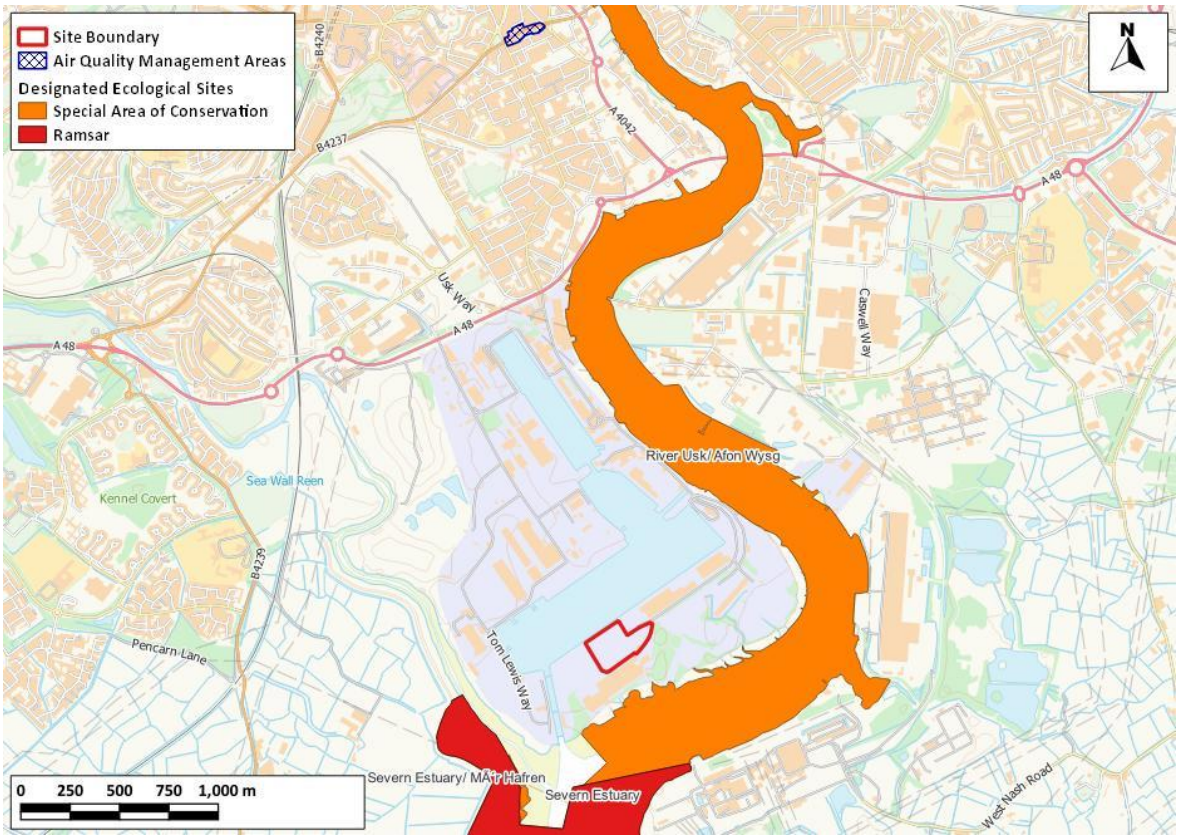

Figure 1: Proposed Development Setting in the Context of Air Quality

1.3 During both construction and operational phases, the proposed development will generate additional traffic on local roads, which may impact on air quality in the local area. Once operational, the on-site activities will include heating air and removing moisture from the raw material and grinding the raw material to make a fine material; emissions from both processes will be emitted via a single stack on-site.

1.4 The main air pollutants of concern related to road traffic emissions and the operational on-site activities are considered to be nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$). Given the volume of potentially dusty material to be imported and crushed, milled and blended on-site there is the potential for dust generated by the operations of the proposed development which may impact on local air quality as well as producing local disamenity. There is also the potential for the construction activities to impact upon existing local receptors. The main pollutants of concern related to construction activities are dust and PM_{10}.

1.5 An air quality assessment is thus required to consider the impacts on sensitive human health and ecological receptors from the following:

- Construction Phase:
    - Dust and particulate matter; and
    - Road traffic – NO_2 and particulate matter.
- Operational phase:
    - Fugitive minerals dust – disamenity dust;
    - Stack emissions – particulate matter and NO_x; and
    - Road traffic– NO_2 and particulate matter.

1.6 This report describes existing local air quality conditions (base year 2022). The assessment of construction dust impacts focuses on the anticipated duration of the works.

1.7 This report has been prepared taking into account all relevant local and national guidance and regulations, and follows a methodology agreed with Newport City Council (NCC).

2 Policy Context

2.1 All European legislation referred to in this report is written into UK law and remains in place.

Air Quality Strategy 2007

2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

The Environmental Permitting (England and Wales) (Amendment) Regulations 2018

2.3 The Medium Combustion Plant Directive (MCPD) (The European Parliament and the Council of the European Union, 2015) regulates pollutant emissions from combustion plant with a rated input between 1 and 50 megawatts (MW_{th}) and was transposed into UK law in January 2018 through an amendment to the Environmental Permitting Regulations (2018). The legislation sets emission limits to be applied from December 2018 for new plant and from 2025 or 2030 for existing plant (depending on the rated input).

2.4 Details of any combustion plant (including size or fuel type) within the proposed development are not confirmed at the time of writing, although it is understood combustion plant will be required as part of the heating/drying process and the fuel options are likely to be hydrogen or natural gas. Whether or not a permit is required will be established once the specification for any proposed combustion plant is confirmed and a suitable air quality assessment will be undertaken, where required.

Clean Air Act 1993 & Environmental Protection Act

2.5 Small combustion plant of less than 20 MW net rated thermal input are controlled under the Clean Air Act 1993 (1993). This requires the local authority to approve the chimney height. Plant which are smaller than 366 kW have no such requirement. Once combustion plant specifications are

known, consideration should be given to whether the local authority's approval is required for the plant to be installed in the proposed development.

2.6 Measures to ensure adequate dispersion of emissions from discharging stacks and vents are included in Technical Guidance Note D1 (Dispersion) (1993), issued in support of the Environmental Protection Act (1990).

Clean Air Strategy 2019

2.7 The Clean Air Strategy (Defra, 2019a) sets out a wide range of actions by which the UK Government, in partnership with the Governments of Scotland, Wales and Northern Ireland, will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

The Clean Air Plan for Wales

2.8 In August 2020, the Welsh Government published the Clean Air Plan for Wales (Welsh Government, 2020), which aims to *"improve air quality and reduce the impacts of air pollution on human health, biodiversity, the natural environment and our economy"*. The Plan sets out the following four themes, around which the plan is structured, with actions in order 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; and
- Place: Creating sustainable places through better planning, infrastructure and transport.

2.9 The Welsh Government subsequently published an Update Report on progress against the actions set out in the Clean Air Plan in April 2023 (Welsh Government, 2023).

2.10 The Plan details intentions to publish a Clean Air Zone Framework in Spring 2021, stating an expectation "*to see Clean Air Zones established in towns and cities throughout Wales to reduce the impact of transport emissions on health. Some of these may be supported by a charging element. Clean Air Zones, where appropriate, would enable a range of co-ordinated actions to deliver significant reductions in public and environmental exposure to harmful airborne pollutants from all sources*". This action has, however, been delayed to enable joint policy development of wider Road User Charging policy with Transport for Wales.

2.11 The Plan also includes plans to "*introduce LAQM policy changes by 2023 to ensure the regime is public health focused and proactively finding and tackling areas of pollution*". These changes include a focus on the human health impacts of $PM_{2.5}$, stating "*In the current regime, monitoring of $PM_{2.5}$ is encouraged but not mandatory. In the context of the known health impacts associated with $PM_{2.5}$, we propose to investigate the extent to which Local Authorities can support monitoring, reporting and action on $PM_{2.5}$ as part of their existing LAQM functions*". In 2024, the Environment (Air Quality and Soundscapes) (Wales) Act (Senedd Cymru, 2024) was passed by the Senedd, which sets out the changes to the LAQM regime, discussed in Paragraph 2.17.

2.12 The Plan states that the Welsh Government will "*publish and consult on a White Paper on a Clean Air Act for Wales before the end of this Senedd Term*", which will include:

- *"New powers for smoke control linked to tackling air pollution from domestic burning ($PM_{2.5}$)*
- *A requirement for a Clean Air Plan / Strategy to be published / reviewed every 5 years*
- *Potential new air quality targets (for example, taking account of WHO guidelines for air quality)*
- *Clarified and strengthened local air quality management legislation*
- *Strengthened powers to address road vehicle idling*
- *Consolidated powers to implement Clean Air Zones / Low Emission Zones*
- *Focused powers to protect vulnerable groups from the effects of air pollution*
- *Enhanced air quality monitoring and modelling*
- *A potential new duty on public bodies to adhere to guidance encouraging different ways of working and actions to reduce air pollution and support decarbonisation."*

Reducing Emissions from Road Transport: Road to Zero Strategy

2.13 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

2.14 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government

has recently announced that 80% of new cars and 70% of new vans sold in Great Britain must be zero emission by 2030, increasing to 100% by 2035. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades.

Environment Act 2021

2.15 The UK's new legal framework for protection of the natural environment, the Environment Act (2021) passed into UK law in November 2021. The Act gives the Government the power to set long-term, legally binding environmental targets.

Environment (Air Quality and Soundscapes) (Wales) Act

2.16 The Act (Senedd Cymru, 2024), which was given Royal Assent in February 2024, requires the Welsh Ministers to set a long-term target for any one of the following pollutants: ammonia, PM_{10}, ozone, nitrogen dioxide, carbon monoxide and sulphur dioxide. In addition, the Act specifies that the Welsh Ministers must set at least one target in relation to annual mean $PM_{2.5}$ concentrations. The Act also sets out the process that Ministers must follow to set a target, and how targets will be reported and reviewed.

2.17 In addition to National Targets, the Act sets out a series of other provisions in relation to:

- *promoting awareness about air quality;*
- *promoting active travel;*
- *the National Air Quality Strategy;*
- *consultation on the existing air quality regulations;*
- *Local Air Quality Management;*
- *smoke control in Wales;*
- *Road charging schemes; and*
- *fixed penalties for stationary idling.*

2.18 With respect to the LAQM regime, the Act sets out the requirements for Local Authorities to carry out annual reviews on air quality, and prepare an Action Plan, that will be approved by Welsh Ministers, and which sets out the means by which the Local Authority will ensure the standards and objectives are met in the area.

Planning Policy

National Policies

2.19 Land-use planning policy in Wales is established within the policy document Planning Policy Wales (PPW12) (Welsh Government, 2024), which provides the strategic policy framework for the effective preparation of local planning authority development plans. With regard to pollution and health effects, in Paragraphs 3.21 to 3.23 it states:

"3.21 Planning authorities have a role to play in the prevention of physical and mental illnesses caused, or exacerbated, by pollution, disconnection of people from social activities (which contributes to loneliness) as well as the promotion of travel patterns which facilitate active lifestyles. The planning system must consider the impacts of new development on existing communities and maximise health protection and well-being and safeguard amenity. This will include considering the provision of, and access to, community and health assets, such as community halls, libraries, doctor's surgeries and hospitals. Health impacts should be minimised in all instances, and particularly where new development could have an adverse impact on health, amenity and well-being. In such circumstances, where health or amenity impacts cannot be overcome satisfactorily, development should be refused".

"3.22 Planning authorities should develop and maintain places that support healthy, active lifestyles across all age and socio-economic groups, recognising that investment in walking and cycling infrastructure can be an effective preventative measure which reduces financial pressures on public services in the longer term. The way a development is laid out and arranged can influence people's behaviours and decisions and can provide effective mitigation against air and noise pollution. Effective planning can provide calming, tranquil surroundings as well as stimulating and sensory environments, both of these make an important contribution to successful places"

"3.23 Green infrastructure can be an effective means of enhancing health and well-being, through linking dwellings, workplaces and community facilities and providing high quality, accessible green spaces. In all development and in public spaces especially, there should be sensitive management of light, and exposure to airborne pollution should be kept as low as reasonably practicable. The compatibility of land uses will be a key factor in addressing air quality and creating appropriate soundscapes which are conducive to, and reflective of, particular social and cultural activities and experiences, particularly in busy central areas of towns and cities. Equally, the provision of quiet, tranquil areas which provide peaceful sanctuaries in otherwise noisy environments can help to reduce general levels of pollution and promote both mental and physical well-being".

2.20 PPW12 places a general presumption in favour of sustainable development, stressing the importance of local development plans, and states that the planning system should perform an environmental role to minimise pollution. Local development plans should enable consideration of the effects that the proposed development may have on air quality, as well as the effect that air

quality may have on the proposed development. To prevent unacceptable risks from air pollution, planning decisions should ensure that new development is appropriate for its location, and states:.

"Development should prevent problems from occurring or getting worse such as the generation of carbon emissions, poor air quality and waste and the depletion of our natural resources which will need to be managed for many years to come."

2.21 PPW12 also places considerable emphasis on the Well-being of Future Generations Act (Welsh Government, 2015) with the intention to improve the social, economic, environmental and cultural well-being of Wales, and outlines how this can be achieved through the concept of 'Placemaking'.

2.22 PPW12 is supported by a series of Technical Advice Notes (TANs) and National Assembly for Wales Circulars. Local planning authorities have to take PPW, TANs and Circulars into account when preparing Development Plans.

2.23 With respect to planning policy guidance, TAN 18 on transport (Welsh Government, 2007) makes reference to local air quality and the need for Air Quality Action Plans to be prepared for any Air Quality Management Areas declared.

2.24 The need for compliance with any statutory air quality limit values and objectives is stressed, and the presence of AQMAs must be accounted for in terms of the cumulative impacts on air quality from individual sites in local areas. New developments in AQMAs should be consistent with local air quality action plans.

Local Transport Plan

2.25 Section 3 of the Newport City Council (NCC) Local Transport Plan (Newport City Council, 2015a) sets out the program of projects for delivery in the period between 2015 and 2020. The *'Air Quality improvements'* scheme refers to air quality, describing that the scheme shall provide:

"…traffic management measures to improve air quality within Air Quality Management Areas."

2.26 Additionally, a longer-term aspiration of the NCC Local Transport Plan is also linked to air quality and aims to *"Ensure that air quality improvement is considered on new and improvement transport schemes and undertake feasibility studies to improve air quality".*

Local Policies

2.27 The Local Development Plan 2011-2026 (Newport City Council, 2015b) was adopted by Newport City Council in January 2015 and includes three policies that are relevant to air quality and the proposed development:

- Policy GP2 'General Development Principles – General Amenity' states that *"Development will be permitted where, as applicable…There will not be a significant adverse effect on local amenity, including in terms of…air quality…";*
- Policy GP4 'General Development Principles – Highways and Accessibility' states that *"Development proposals should…be designed to avoid or reduce…air pollution…"*; and
- Policy GP7 'General Development Principles – Environmental Protection and Public Health' states that *"Development will not be permitted which would cause or result in unacceptable harm to health because of …air…pollution…".*

2.28 In addition, NCC is currently developing the Newport Replacement Local Development Plan which will be about how land in and around Newport should be developed over the next fifteen years.

2.29 In February 2018 Newport City Council also adopted a Supplementary Planning Guidance (SPG) document on Air Quality (Newport City Council, 2018). The purpose of this SPG is to help ensure consistency in the way in which air quality is dealt with through the planning system. The SPG provides information on air quality issues within Newport and relevant legislation and policy and outlines the recommended approach to conducting an air quality assessment within the borough.

Air Quality Action Plans

National Air Quality Plan

2.30 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); the Welsh Government produced a supplemental plan to the 2017 UK plan for tackling roadside nitrogen dioxide concentrations (Welsh Government, 2018). The document sets out the work done to date to identify how the Welsh Government will reduce concentrations of nitrogen dioxide around roads where levels are above legal limits. The plan expands on Section 7.6 (Additional Actions in Wales) of the 2017 UK plan for tackling roadside nitrogen dioxide concentrations, and sets out how the Welsh Government will comply within the shortest possible time with the limit values for nitrogen dioxide.

2.31 The supplement plan identified that the annual mean limit value for nitrogen dioxide was exceeded between Junctions 25 and 26 of the M4 in Newport. As the relevant highway authority, exceedances on motorways and trunk roads are the responsibility of the Welsh Ministers, rather than the local authority.

2.32 There is currently no straightforward way to take account of the effects of the 2017 UK Plan or 2018 Welsh Supplement in this assessment; however, consideration has been given to whether there is currently, or is likely to be in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

2.33 NCC has declared eleven AQMAs for exceedances of the annual mean nitrogen dioxide objective, one of which is within 3 km of the proposed development. NCC's Air Quality Action Plan for the years 2023 to 2028 (Newport City Council, 2023a) sets out a series of measures by which it will seek to achieve the air quality objectives in its AQMA's. None of the policies are especially relevant to this assessment, being focussed on locations outside of the immediate assessment area (i.e. within the AQMAs) or being focussed on the impact of transport on air quality.

3 Assessment Guidance and Criteria

Health Criteria

3.1 The Welsh Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Welsh Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (Wales) Regulations (2000) and the Air Quality (Amendment) (Wales) Regulations (2002).

3.2 The UK-wide objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 µg/m^3 (Defra, 2022). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level.

3.3 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2022). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

3.4 For $PM_{2.5}$, the objective set by Defra for local authorities is to work toward reducing concentrations without setting any specific numerical value. In the absence of a numerical objective, it is convention to assess local air quality impacts against the limit value (see Paragraph 3.5), originally set at 25 µg/m^3 and currently set at 20 µg/m^3.

3.5 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$, and is implemented in UK law through the Air Quality Standards Regulations (2010)[1]. The limit values for nitrogen dioxide and PM_{10} are the same numerical concentrations as the UK objectives, but achievement of the limit values is a national

[1] As amended through The Air Quality Standards (Amendment) Regulations 2016 and The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020.

obligation rather than a local one and concentrations are reported to the nearest whole number. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

3.6 The relevant air quality criteria for this assessment are provided in Table 1.

Table 1: Air Quality Criteria for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Value
Nitrogen Dioxide	1-hour Mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
PM_{10}	24-hour Mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3
$PM_{2.5}$	Annual Mean	20 µg/m^3 [a]

[a] There is no numerical $PM_{2.5}$ objective for local authorities (see Paragraph 3.4). Convention is to assess against the UK limit value which is currently 20 µg/m^3.

Construction Dust Criteria

3.7 There are no formal assessment criteria for dust. In the absence of formal criteria, the approach developed by the Institute of Air Quality Management (IAQM)[2] (2024) has been used. Full details of this approach are provided in Appendix A1.

Operational Dust Guidance and Criteria

3.8 Dust is categorised into two size classes: 'suspended dust' with diameters below 10 µm (PM_{10}) or below 2.5 µm ($PM_{2.5}$) and 'disamenity' dust with diameters between 10 µm to 75 µm.

3.9 Suspended dusts remain in the air for long periods and are fine enough to be inhaled, potentially causing health effects. Disamenity dusts have a larger particle size, which deposit on surfaces more easily, may be visible to the naked eye, and can cause loss of amenity through soiling and staining, being generally associated with nuisance impacts.

3.10 The assessment criteria for suspended dust are the air quality objectives for PM_{10} and $PM_{2.5}$, which are presented in Table 1. There are currently no statutory standards in the UK covering the release and subsequent impacts of disamenity dust, or levels for dust deposition above which 'nuisance' is deemed to exist. This is due to the inherently subjective nature of nuisance, and is highly dependent upon the existing conditions. Determination of whether or not dust constitutes a statutory nuisance

[2] The IAQM is the professional body for air quality practitioners in the UK.

in these cases is usually the responsibility of the local planning authority or the Natural Resources Wales (NRW).

3.11 The IAQM has produced guidance on the Assessment of Mineral Dust Impacts for Planning (IAQM, 2016). Full details of this approach are provided in Appendix A4. This guidance is intended for the use on mineral sites such as quarries; however, it is also noted that it may be applicable to sites recycling aggregates.

Operational Point Source

3.12 Defra's Industrial Emissions Screening Tool (Defra, 2017) has been developed to help local authorities determine, for each pollutant and air quality objective of concern, the maximum annual emissions from an industrial installation for which a risk of exceedance is unlikely. LAQM Technical Guidance (Defra, 2022) notes that if the actual emissions are greater than the maximum emissions from the screening tool, then detailed dispersion modelling and/or monitoring should be undertaken.

Screening Criteria

Road Traffic Assessments

Assessing the Impacts on Human Health

3.13 Environmental Protection UK (EPUK) and the IAQM recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air quality impacts. The approach, as described in Appendix A1, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m^2 of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment.

3.14 The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. The screening thresholds (described in full in Appendix A2 inside an AQMA are a change in flows of more than 25 Heavy Duty Vehicles (HDVs) or 100 Light Duty Vehicles (LDVs) per day; outside of an AQMA the thresholds are 100 HDVs or 500 LDVs. Where these criteria are exceeded, a detailed assessment is likely to be required, although the guidance advises that *"the criteria provided are precautionary and should be treated as indicative"*, and *"it may be appropriate to amend them on the basis of professional judgement"*.

Assessing the Impacts on Ecological Receptors

3.15 The Joint Nature Conservation Committee (JNCC) has published Decision Making Thresholds (DMTs) to identify those projects which can immediately be discounted as unlikely to have a significant effect on biodiversity, either alone or in combination with other projects and plans (Chapman and Kite, 2021). With limited exceptions, no further assessment is required wherever:

- The designated sites are European sites, and the proposed development has been included within the Habitats Regulations Assessment of an adopted Local Plan; or
- The roads affected by the proposed development are more than 200 m from any designated site, or in some cases, from the notified features within those sites; or
- The affected roads are part of the Strategic Road Network, unless the proposed development is itself a highways improvement scheme; or
- The increase to traffic flows caused by the proposed development alone, on any road within 200 m of a designated site, is less than 0.15% of the existing Annual Average Daily Traffic (AADT) flow on that road (AQC, 2021).

Operational Dust

3.16 The IAQM Guidance on the assessment of Mineral Dust Impacts for Planning (IAQM, 2016) details screening criteria to determine whether dust emissions have the potential for significant air quality impacts. The screening criteria are designed for minerals sites, but in the absence of other published criteria, they have been applied (using professional judgement) in this assessment. The screening criteria are based on the distance of receptors to dust-generating activities.

3.17 The screening criteria are as follows:

- if there are no relevant receptors within 1 km of the operations, then a detailed dust assessment can be screened out. In such a case, it is considered that, irrespective of the nature, size and operation of the site, the risk of an impact is likely to be “negligible” and any resulting effects are likely to be ‘not significant’;
- in cases whereby receptors are located between 400 m (for hard rock quarries) or 250 m (for sand and gravel quarries) and 1 km of operations, it would normally be assumed that a detailed disamenity dust impact assessment is not required. However, the decision on whether to assess should be made and justified on a site-specific basis; and
- if there are relevant human and/or ecological receptors within 250 m or 400 m (depending on the rock type) then a disamenity dust impact assessment will almost always be required.

3.18 Where the potential dust impact of a mineral site cannot be ‘screened out’, a more detailed dust assessment will be required.

4 Assessment Approach and Significance of Impacts

Consultation

4.1 The assessment follows a methodology agreed with Newport City Council via email correspondence between Steve Manning (Senior Scientific Officer at Newport City Council) and Anna McMahon (Air Quality Consultants) on 16 April 2024. Specifically, the following key points were agreed:

- a construction dust risk assessment will be provided;
- traffic generated by the proposed development will not be sufficiently great to require dispersion modelling and qualitative assessment of operational phase traffic will be provided;
- emissions of nitrogen dioxide and PM_{10} from operational phase on-site point source will be screened using the *Defra Industrial Emissions Screening Tool v3.0*., due to the proposed development being located well away from any sensitive human receptors;
- operational phase dust and particulate matter from materials handling on-site will be assessed using the principles of the IAQM '*Guidance on the Assessment of Mineral Dust Impacts for Planning 2016 v1.1*';
- The NCC Officer noted that the air quality assessment should include the screening levels that the proposed development will meet in terms of its potential emissions which may impact on human health; and
- The NCC Officer also noted that the proposed development may require an environmental permit.

4.2 In July 2024, the project transport consultants (SCP Transport) provided revised traffic data. The revised traffic data are still below relevant screening criteria for human health (see paragraphs 7.1 to 7.3), however the screening criteria for ecological receptors are no longer below the relevant screening criteria (see paragraph 7.6) and a further quantitative assessment has been undertaken (Appendix A7).

Existing Conditions

4.3 Existing sources of emissions and baseline air quality conditions within the study area have been defined using a number of approaches:

- industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2024a);
- information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority from the Council's Air Quality Review and Assessment reports (Newport City Council, 2023b);

- 2022 background concentrations have been defined using Defra's 2018-based background maps. These cover the whole of the UK on a 1x1 km grid; and
- whether or not there are any exceedances of the annual mean limit value for nitrogen dioxide in the study area has been identified using the maps of roadside concentrations published by Defra (2020; 2024b), as well as from any nearby Automatic Urban and Rural Network (AURN) monitoring sites (which operate to the required data quality standards). These are the maps used by the UK Government, together with the results from national AURN results, to identify and report exceedances of the limit value. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations (Defra, 2024b), which are available for the years 2009 to 2019, show no exceedances of the limit values anywhere in the UK in 2019.

Construction Impacts

4.4 The construction dust assessment considers the potential for impacts within 250 m of the site boundary, or within 50 m of roads used by construction vehicles. The assessment methodology is that provided by IAQM (2024). This follows a sequence of steps. Step 1 is a basic screening stage, to determine whether the more detailed assessment provided in Step 2 is required. Step 2a determines the potential for dust to be raised from on-site works and by vehicles leaving the site. Step 2b defines the sensitivity of the area to any dust that may be raised. Step 2c combines the information from Steps 2a and 2b to determine the risk of dust impacts without appropriate mitigation. Step 3 uses this information to determine the appropriate level of mitigation required to ensure that there should be no significant impacts. Appendix A1 explains the approach in more detail.

4.5 Guidance from IAQM (2024) is that, with appropriate mitigation in place, the effects of construction dust will be 'not significant'. The assessment thus focuses on determining the appropriate level of mitigation so as to ensure that effects will normally be 'not significant'.

Road Traffic Impacts

Screening – Human Receptors

4.6 The first step in considering the road traffic impacts of the proposed development in relation to sensitive human receptors has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraph 3.13 and detailed further in Appendix A2. Where impacts can be screened out there is no need to progress to a more detailed assessment.

4.7 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach developed jointly by Environmental Protection UK (EPUK) and the IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement, taking account of

the impact descriptors; the experience of the consultants preparing the report is set out in Appendix A3. Full details of the EPUK/IAQM approach are provided in Appendix A1.

Screening – Ecological Receptors

4.8 To consider the road traffic impacts on sensitive ecological receptors, the JNCC DMTs (paragraph 3.15) have been considered. Where the DMTs are met then no significant effect on ecological receptors is expected, and no further assessment is required. Where the DMTs are exceeded then further assessment is necessary (see Appendix A7).

Operational Dust Impacts

4.9 The handling of aggregates has the potential to generate dust emissions. The operational dust assessment considers the potential for impacts within certain distances of the site boundary. The first stage of the assessment is to consider the location of dust generating sources in the site boundary and the distance to nearby receptors (see Paragraph 3.17). If a detailed dust assessment is required, the assessment of dust emissions is undertaken in a qualitative manner using a risk-based approach based on a Source-Pathway-Receptor approach.

4.10 If a dust assessment is required, the IAQM minerals guidance (IAQM, 2016) necessitates a dust risk assessment for both suspended (human health) and disamenity dust. The approach is described in detail in Appendix A4.

Operational Point Source Impacts

4.11 Once operational, the on-site activities will include heating air and removing moisture from the raw material and grinding the raw material to make a fine material; emissions from both processes will be emitted via a single on-site stack. Defra's Industrial Emissions Screening Tool (Defra, 2017) has been used to determine the maximum annual emissions for nitrogen dioxide and PM_{10} from the proposed point source that could lead to a risk of exceedance of the relevant air quality objectives. At the time of writing, details of the proposed combustion plant to be used for the heating process was not known. The operator for the proposed development has a similar site based in Ghent, Belgium and therefore proxy emissions data has been taken from point source monitoring undertaken at the Ghent site along with parameters that are known for the proposed development (e.g. proposed stack height and diameter, distance to receptors, background concentrations etc.). The assumed specification and emissions for this plant, upon which the assessment is based, are set out in Appendix A5.

4.12 The methodology consists of comparing the estimated actual annual emissions for nitrogen dioxide and PM_{10} for the proposed point source against the maximum annual emissions calculated by the tool. If estimated actual emissions are greater than the maximum emissions, then a more detailed assessment, based on dispersion modelling and/or monitoring would be recommended. Where the

estimated annual emissions are below the maximum emissions calculated by the tool, then exceedance of the relevant air quality objectives is considered unlikely.

5 Baseline Conditions

Relevant Features

5.1 The proposed development is located within the Port of Newport complex on the southern side of the South Dock, Alexandra Docks, and is bounded by industrial facilities to the east, west, and south. The site currently consists of land previously developed with ship loading equipment, rail sidings, small built structures, a pond and scrubland. The nearest residential estate is at Tredegar Park, approximately 1.8 km to the west, although the nearest residential property is a single farmhouse approximately 1.2 km west-southwest of the site and there are also farm properties approximately 1.9 km to the east. Road access to the site is gained via East Way Road security station, giving access directly from and onto the A48 Usk Way.

5.2 The proposed development is located near to the River Usk SAC and the Severn Estuary Ramsar Site as shown in Figure 1.

Industrial Sources

5.3 There are a number of industrial sites in the vicinity of the proposed development. These include Burn Boulton & Haywood Ltd, TG Howells & Sons Ltd and Supply Chain Solutions, which all involve the manufacture of wood products, and Sims Group UK Ltd, which involves the treatment and disposal of hazardous waste. These are existing industrial installations and therefore any emissions to air would be anticipated to form part of the baseline concentrations presented within this section.

5.4 In addition, planning permission (ref: 20/0237) was granted with conditions for a Plasterboard Manufacturing Factory approximately 400 m east of the proposed development and based on available mapping data the factory now appears to have been built. An AQA was undertaken for the proposed factory (Hawkins Environmental, 2020) which found that "*due to limited traffic generation, as well as a flue design that disperses pollutants before they reach sensitive receptors, the impact of emissions from the proposed development is considered to be negligible*".

Local Air Quality Monitoring

5.5 NCC operates one automatic monitoring station in addition to one AURN monitoring site within its area. Both of these automatic sites are approximately 5 km north of the proposed development. The Council also operates a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Socotec (using the 50% triethanolamine (TEA) in acetone method). These include one in the George Street AQMA, approximately 3 km north of the proposed development and three along Corporation Road, approximately 2.5 km northwest of the proposed development. Annual mean results for the years 2018 to 2022 are summarised in Table 2, while results relating to the 1-hour mean objective are summarised in

5.6 Table 3. Exceedances of the objectives are shown in bold. The monitoring locations are shown in Figure 2. The monitoring data have been taken from NCC's 2023 Annual Progress Report for 2022 (Newport City Council, 2023b).

Table 2: Summary of Annual Mean NO_2 Monitoring (2018-2022) (µg/m^3) [a]

Site No.	Site Type	Location	2018	2019	2020	2021	2022
AN1	Urban Background	St Julian's	19.0	20.0	15.0	15.1	15.0
AN2	Roadside	M4 Old Barn	**41.0**	36.5	28.3	32.4	29.2
NCC11A	Roadside	169 Caerleon Road	31.0	32.3	25.2	26.4	25.3
NCC13A	Roadside	Corporation Road Flats Crossing	-	-	26.9	29.2	26.7
NCC19A	Roadside	700 Corporation Road	-	-	30.0	29.8	26.9
NCC42	Roadside	69 Cardiff Road (Bellevue Stores)	25.4	24.0	18.1	24.7	25.4
NCC51	Facade	81 George Street	37.5	**41.1**	32.8	31.9	32.9
Objective			**40**				

[a] Exceedances of the objectives are shown in **bold.**

Table 3: Number of Hours with NO_2 Concentrations above 200 µg/m^3

Site No.	Site Type	Location	2018	2019	2020	2021	2022
AN1	Urban Background	St Julian's	0 (75)	0	0	0	0 (69.5)
AN2	Roadside	M4 Old Barn	1	0	0	0	0 (102)
Objective			**18 (200) [a]**				

[a] Values in brackets are 99.79th percentiles, which are presented where data capture is <85%.

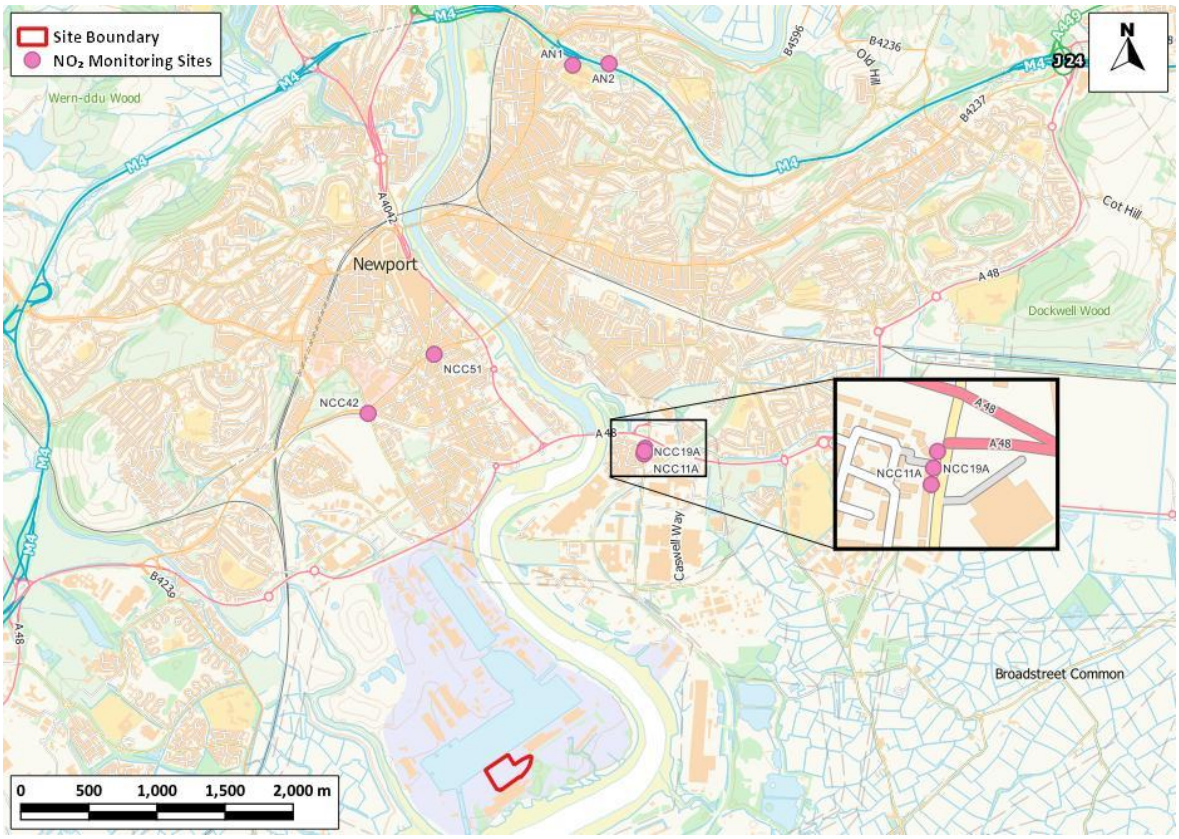

Figure 2: Monitoring Locations

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5.7 There were no measured exceedances of the annual mean or short term NO_2 objectives in 2022, and overall concentrations at all monitoring sites have decreased since 2018.

5.8 While 2020 and 2021 results have been presented in this Section for completeness, they are not relied upon in any way as they will not be representative of 'typical' air quality conditions due to the considerable impact of the Covid-19 pandemic on traffic volumes and thus pollutant concentrations.

5.9 The AN1 automatic monitoring station measured both PM_{10} and $PM_{2.5}$ concentrations in 2022 and the measured concentrations were well below the objectives. Annual mean PM_{10} and $PM_{2.5}$ results for the years 2018 to 2022 are summarised in Table 4, while results relating to the daily mean PM_{10} objective are summarised in Table 5.

5.10 There were no measured exceedances of the annual mean PM_{10} or $PM_{2.5}$, nor 24-hour PM_{10} objectives between 2018 and 2022.

Table 4: Summary of Annual Mean PM_{10} and $PM_{2.5}$ Monitoring (2018-2022) (µg/m³)

Site No.	Site Type	Location	2018	2019	2020	2021	2022
PM_{10}							
AN1	Urban Background	St Julian's	14	15	13	12	13
Objective			**40**				
$PM_{2.5}$							
AN1	Urban Background	St Julian's	8	10	8	7	7
Objective			**20 [a]**				

[a] The 20 µg/m³ $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Table 5: Number of Days With PM_{10} Concentrations Above 50 µg/m³

Site No.	Site Type	Location	2018	2019	2020	2021	2022
AN1	Urban Background	St Julian's	0	5	0	0	0
Objective			**35**				

Exceedances of Limit Value

5.11 The AN1 AURN monitoring site shows no exceedance of the annual mean nitrogen dioxide limit value in 2022 (Table 2). Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2024b), which are used to identify and report exceedances of the limit value, do not identify any exceedances along the A48 where the proposed development will lead to changes in traffic flows. As such, there is considered to be no risk of a limit value exceedance along the A48 adjacent to the River Usk SAC once the proposed development is operational.

Background Concentrations

5.12 Estimated background concentrations at the site of the proposed development are set out in Table 6 and are all well below the objectives. A range of values is presented as the site covers two 1x1 km grid squares.

Table 6: Estimated Annual Mean Background Pollutant Concentrations in 2022 (µg/m³)

Year	NO_2	PM_{10}	$PM_{2.5}$
2022	14.3 – 16.2	11.4 – 11.6	7.3 – 7.4
Objective	**40**	**40**	**20 [a]**

[a] The 20 µg/m³ $PM_{2.5}$ objective, which was to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Meteorological Data

5.13 The nearest representative weather station to the proposed development which had data for the year 2022 is the weather station at Cardiff Airport, approximately 30 km southwest of the proposed development. Rainfall and windspeeds are important for dust transportation, and dry windy days have a higher risk of causing disamenity. The IAQM minerals guidance (IAQM, 2016) classes 'potentially dusty winds' as those where wind speed is >5 m/s and from the direction of the dust source on 'dry' days (<0.2 mm per day). Table 7 presents rainfall data for the Cardiff site.

5.14 Wind speed and direction are also primary drivers of dust transportation. As such, a 5-year average windrose for Cardiff is also presented in Figure 3, showing wind directions and speeds, which have been taken into account when determining the frequency of potentially dusty winds in the operational dust assessment in Section 7.

Table 7: Rainfall Data for Cardiff (2018 – 2022)

Year	Number of Days of Precipitation >=0.2 mm [a]
2018	175
2019	173
2020	151
2021	159
2022	174
Average	**166.4**

[a] Rainfall threshold taken from IAQM guidance **(IAQM, 2016)**.

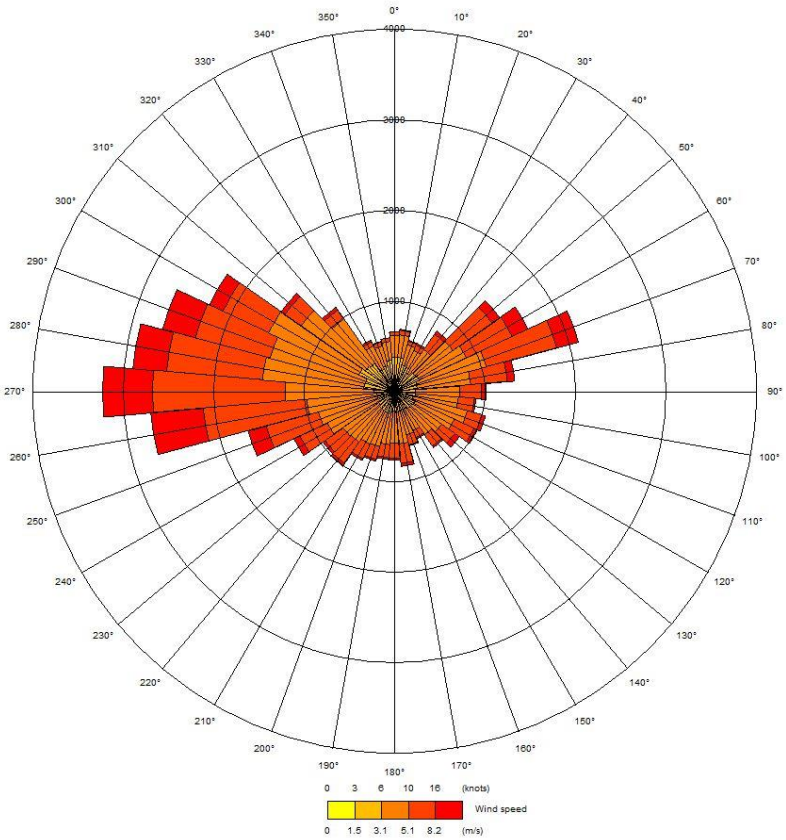

Figure 3: Cardiff Windrose (2018 – 2022)

6 Construction Phase Impact Assessment

Construction Traffic

6.1 It is anticipated that no more than ten heavy vehicles will access the site on any given day, thus the additional heavy vehicle movements on local roads will be well below the 100 AADT (outside of AQMAs) and 25 AADT (inside of AQMAs) screening criterion recommended by EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017). It is, therefore, not considered necessary to assess the impacts of traffic emissions during the construction phase and it can be concluded that the proposed development will not have a significant impact on local roadside air quality as a result of construction traffic emissions.

On-Site Exhaust Emissions

6.2 The IAQM guidance (IAQM, 2024) states:

"Experience of assessing the exhaust emissions from on-site plant (also known as non-road mobile machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality, and in the vast majority of cases they will not need to be quantitatively assessed. For site plant and on-site traffic, consideration should be given to the number of plant/vehicles and their operating hours and locations to assess whether a significant effect is likely to occur".

The proposed development is large, and there are no sensitive receptors within 50 m of the proposed site. The areas in which NRMM and site traffic will typically operate will thus be located well over 50 m away from any sensitive properties. It is judged that there no risk of significant effects at existing receptors as a result of on-site machinery emissions.

Construction Dust and Particulate Matter Emissions

6.3 The construction works will give rise to a risk of dust impacts during demolition, earthworks and construction, as well as from trackout of dust and dirt by vehicles onto the public highway. Step 1 of the assessment procedure is to screen the need for a detailed assessment. There are receptors within the distances set out in the guidance (see Appendix A1), thus a detailed assessment is required. The following section sets out Step 2 of the assessment procedure.

Potential Dust Emission Magnitude

Demolition

6.4 There is no requirement for demolition on site.

Earthworks

6.5 The characteristics of the soil at the site have been defined using the British Geological Survey's UK Soil Observatory website (British Geological Survey, 2024), as set out in Table 8. Overall, it is considered that, when dry, this soil has the potential to be moderately dusty.

Table 8: Summary of Soil Characteristics

Category	Record
Soil Layer Thickness	Deep
Soil Parent Material Grain Size	Mixed (Argillaceous [a] – Arenaceous [b])
European Soil Bureau Description	Quaternary Marine/Estuarine Clay/Silt
Soil Group	Medium (Silty) to Light (Silty) to Heavy
Soil Texture	Clayey Loam [c] to Silty Loam

[a] grain size < 0.06 mm.

[b] grain size 0.06 – 2.0 mm.

[c] a loam is composed mostly of sand and silt.

6.6 The site covers approximately 50,000 m^2 and most of this will be subject to earthworks, involving excavation for the basement and foundations, haulage and stockpiling. The earthworks will last around 2 months and dust will arise mainly from vehicles travelling over unpaved ground and from the handling of dusty materials (such as dry soil). Based on the example definitions set out in Table A1.1 in Appendix A1, the dust emission class for earthworks is considered to be *medium*.

Construction

6.7 The proposed development involves the construction of an industrial plant comprised mainly of concrete and steel, with a total building volume of well over 75,000 m^3. Dust will arise from piling and from the handling and storage of dusty materials. The construction will take place over a two-year period. Based on the example definitions set out in Table A1.1 in Appendix A1, the dust emission class for construction has been conservatively considered to be *large*.

Trackout

6.8 It has been advised that the number of heavy vehicles accessing the site, which may track out dust and dirt, will be a maximum of 10 outward heavy vehicle movements per day. There is a tarmac road through the middle of the site and therefore any unsurfaced areas that vehicles access within the site will be limited as for the majority of the site the vehicles can travel on a made road. Based on the example definitions set out in Table A1.1 in Appendix A1, the dust emission class for trackout is considered to be *small*.

6.9 Table 9 summarises the dust emission magnitude for the proposed development.

Table 9: Summary of Dust Emission Magnitude

Source	Dust Emission Magnitude
Demolition	N/A
Earthworks	Medium
Construction	Large
Trackout	Small

Sensitivity of the Area

6.10 This assessment step combines the sensitivity of individual receptors to dust effects with the number of receptors in the area and their proximity to the site. It also considers additional site-specific factors such as topography and screening, and in the case of sensitivity to human health effects, baseline PM_{10} concentrations.

6.11 The IAQM guidance explains that residential properties are 'high' sensitivity receptors to dust soiling, while the offices and workplaces on the surrounding industrial sites have been considered 'low' sensitivity receptors (Table A1.2 in Appendix A1, taking into account the existing industrial nature of the area). Residential properties are also classified as being of 'high' sensitivity to human health effects, while places of work such as the industrial sites of the South Dock are considered to be 'medium' sensitivity within this assessment for human health. There are no residential properties within 250 m of the site, but there are a number of industrial places of work within 20 m of the site (see Figure 4).

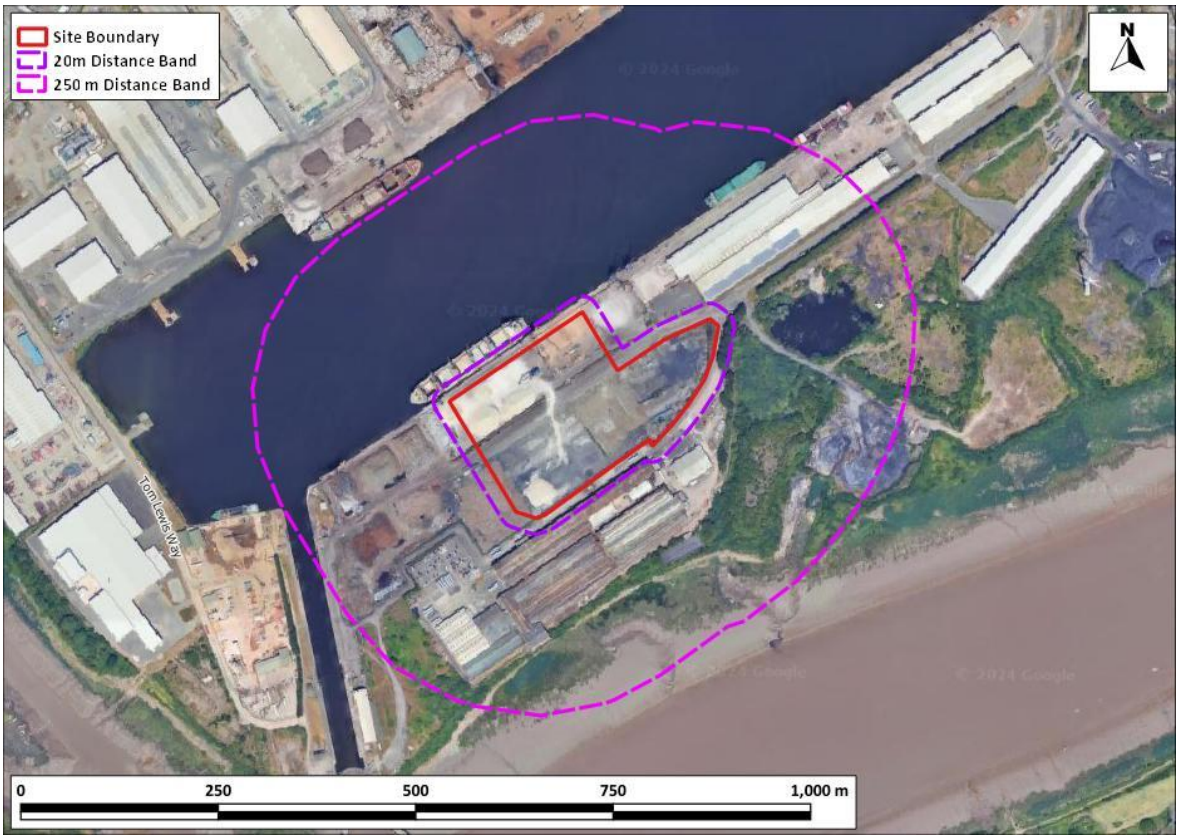

Figure 4: 20 m and 250 m Distance Bands around Site Boundary

Imagery ©2024 Airbus, Bluesky, Infoterra ltd & COWI A/S, Maxar Technologies, Map data ©2024 Google.

6.12 The IAQM guidance (IAQM, 2024) explains that there is a risk of material being tracked within 50 m from the edge of the road up to 250 m from the site exit. There are no residential properties within 50 m but there is an industrial place of work within 20 m of the road along which material could be tracked (see Figure 5).

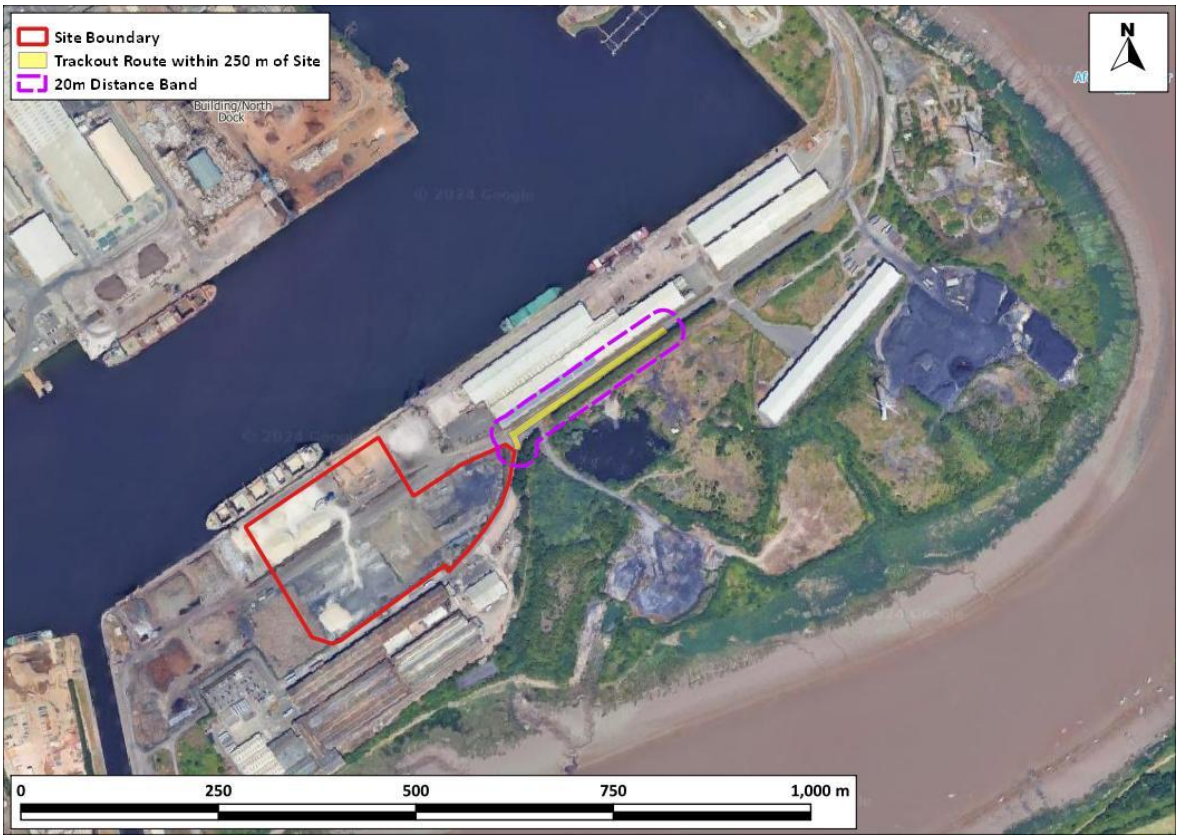

Figure 5: 20 m Distance Band around Roads Used by Construction Traffic Within 250 m of the Site Exit

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Sensitivity of the Area to Effects from Dust Soiling

6.13 Using the information set out in Paragraph 6.11 and Figure 4 alongside the matrix set out in Table A1.3 in Appendix A1, the area surrounding the onsite works is of 'low' sensitivity to dust soiling. Using the information set out in Paragraph 6.12 and Figure 5 alongside the same matrix, the area is also of 'low' sensitivity to dust soiling due to trackout.

Sensitivity of the Area to any Human Health Effects

6.14 Table A1.4 in Appendix A1 requires information on the baseline annual mean PM_{10} concentration in the area. Based on the Defra 2018-based background maps (Defra, 2024c) (see Table 6), the existing annual mean PM_{10} concentration in the area around the site is expected to be <24 µg/m^3. Using the information set out in Paragraphs 6.11 and Figure 4 alongside the matrix in Table A1.4 in Appendix 54A1, the area surrounding the onsite works is of 'low' sensitivity to human health effects. Using the information set out in Paragraph 6.12 and Figure 5 alongside the same matrix, the area surrounding roads along which material may be tracked from the site is also of 'low' sensitivity.

Sensitivity of the Area to any Ecological Effects

6.15 The guidance only considers designated ecological sites within 50 m to have the potential to be impacted by the construction works. There are no designated ecological sites within 50 m of the site boundary or those roads along which material may be tracked, thus ecological impacts will not be considered further.

Summary of the Area Sensitivity

6.16 Table 10 summarises the sensitivity of the area around the proposed construction works.

Table 10: Summary of the Area Sensitivity

Effects Associated With:	Sensitivity of the Surrounding Area	
	On-site Works	Trackout
Dust Soiling	Low Sensitivity	Low Sensitivity
Human Health	Low Sensitivity	Low Sensitivity

Risk and Significance

6.17 The dust emission magnitudes in Table 9 have been combined with the sensitivities of the area in Table 10 using the matrix in Table A1.6 in Appendix A1, in order to assign a risk category to each activity. The resulting risk categories for the three construction activities, without mitigation, are set out in Table 11. These risk categories have been used to determine the appropriate level of mitigation as set out in Section 8 (step 3 of the assessment procedure).

Table 11: Summary of Risk of Impacts Without Mitigation

Source	Dust Soiling	Human Health
Earthworks	Low Risk	Low Risk
Construction	Low Risk	Low Risk
Trackout	Negligible	Negligible

6.18 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant' (IAQM, 2024).

7 Operational Phase Impact Assessment

Assessment of Development-Generated Road Traffic Emissions

Human Health Receptors

7.1 Once operational, the site will require a small workforce with an estimated workforce of 10 staff members per shift during the day and two staff members per shift outside of the day shift working hours. The road trip generation for staff or small delivery vehicles is, therefore, anticipated to be minimal and well below the EPUK/IAQM screening criteria (500 LDVs as an AADT outside of an AQMA and 100 LDVs as an AADT inside of an AQMA).

7.2 Table 12 presents the predicted trip generation for HDVs once the proposed development is operational, as provided by the project transport consultants (SCP Transport Planning).

Table 12: Materials Transportation and HDV Trip Generation Associated with each Phase of the Proposed Development

Phase	Description	Tonnes per Annum	HDV AADT
1	Site preparation, connection to services, security fencing, provision of foundations.	-	-
2	Importation, storage and onward distribution of cement or cement substitutes.	100,000	18
3	Importation of raw materials such as cement clinker and slag, construction and operation of mill processing, manufacture of cement and cement substitutes and onward distribution.	1,000,000	183

7.3 The greatest HDV movements are expected in phase 3 with the proposed development predicted to generate a total of 183 daily HDV trips. The HDVs will access and exit the site on East Way Road after which SCP Transport Planning have advised a 50/50 split onto the A48, so there will be approximately 92 daily HDV trips on the A48 to both the west and east of East Way Road. The daily HDV trip rates on roads adjacent to human receptors will therefore be below the screening threshold of 100 HDVs recommended for use outside an AQMA in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) (see Paragraph 3.14). It has been advised that traffic generated by the proposed development will have sufficiently dispersed such that the screening threshold of 25 HDVs recommended for use within an AQMA is unlikely to be exceeded within any of the NCC AQMAs. It is, therefore, judged that the relevant screening thresholds will not be exceeded and there is no requirement for a detailed assessment of road traffic impacts at existing human receptors; it can be concluded that the proposed development will not have a significant impact on local roadside air quality for human receptors.

Ecological Receptors

7.4 As discussed in Paragraph 5.2, there are two designated ecological sites in the vicinity of the proposed development.

7.5 The Severn Estuary Ramsar site is not located within 200 m of any of the roads where traffic generated by the proposed development will travel. As such, the JNCC DMT is met with the roads affected by the proposed development being more than 200 m from the Severn Estuary; it is, therefore, concluded that the effects on this area will not be significant and no further assessment is required.

7.6 The project ecologists (Ramm Sanderson Ecology Ltd) have advised for the River Usk SAC there are no sensitive habitats within 200 m of the East Way Road where HDVs will access and exit the site. They have also advised that there is an area of saltmarsh habitat in the River Usk SAC within 200 m of the A48 as shown in Figure 6 which would be sensitive to nitrogen deposition. During phase 3 (when the greatest HDV trips will be generated), it has been estimated that 9 LDVs and 92 HDVs as an AADT (see Paragraph 7.1) will be generated on the A48 east of the site access and thus will pass within 200 m of the River Usk SAC where sensitive saltmarsh habitat is likely to be present. The total number of existing trips on this road link in 2022 is 38,894 AADT (DfT, 2024). The proposed development HDV generated trips are 0.24% of existing flows on the A48. The increase to traffic flows caused by the proposed development on any road within 200 m of the sensitive area within this designated site therefore exceeds the JNCC DMT criterion of 0.15% of the existing AADT flow on that road. As such, a full assessment of the impacts of development generated traffic on the relevant area of the River Usk SAC has been completed. The assessment concludes that the impact on this area will be negligible. A detailed report of this assessment is provided in Appendix A7.

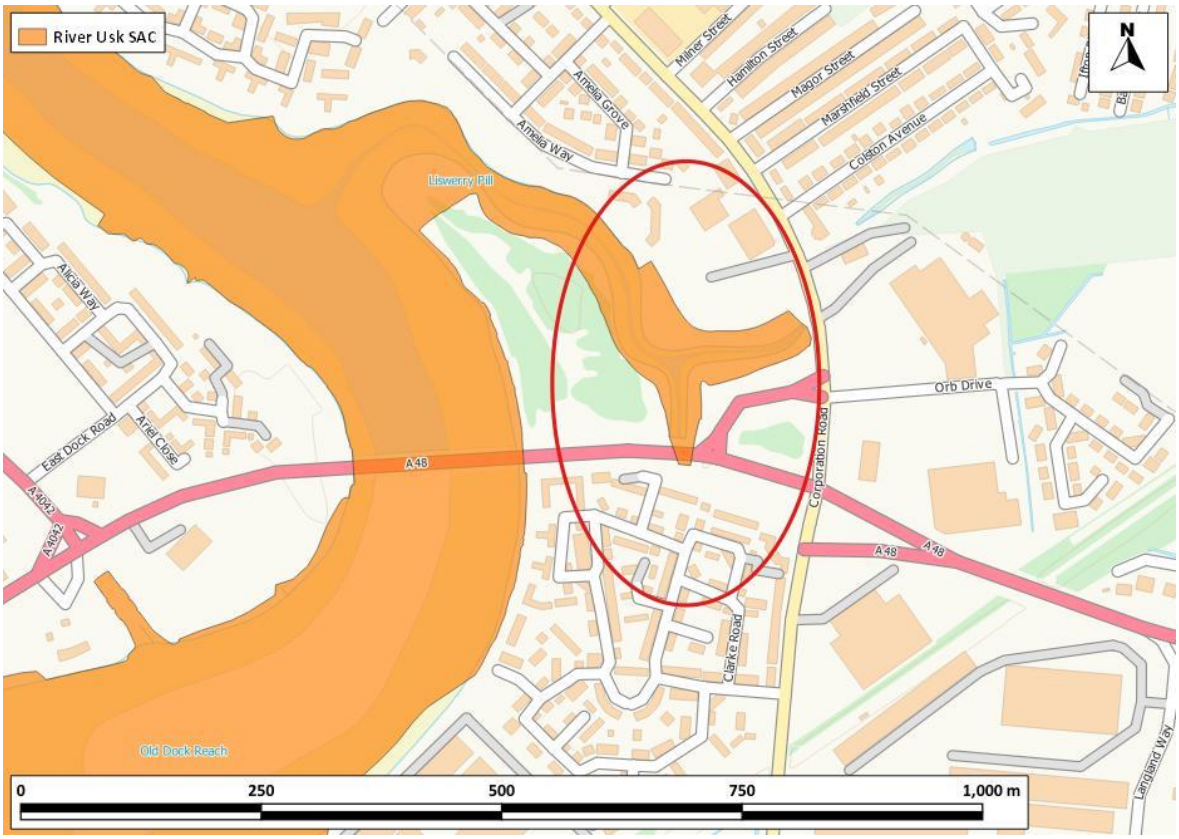

Figure 6: Saltmarsh Area of the River Usk Sensitive to Nitrogen Deposition

Assessment of Operational Dust Impact

Suspended (Human Health) Dust

7.7 IAQM's Mineral Dust guidance (IAQM, 2016) describes that if there are no relevant receptors within 1 km of the operations, and the PM_{10} air quality objectives are not likely to be exceeded, then a detailed dust assessment can be screened out and good practice measures will be sufficient to avoid significant impacts.

7.8 No high sensitivity human receptors (e.g. residential properties) have been identified within 1 km of the proposed development (see Paragraph 5.1) where the PM_{10} objectives would apply. The guidance notes that although the air quality objectives and limit values do not apply at places of work, individuals may still be affected and should be considered where an assessment is required. There are a number of industrial places of work within 1 km of the site. The background PM_{10} and $PM_{2.5}$ concentrations in the area (which are judged to represent the receptors within 1 km of the site), however, are well below the objectives (see Table 6) and significant impacts are therefore unlikely, as long as best practice measures are adhered to.

7.9 It is noted that any emissions from the Plasterboard Factory development located approximately 400 m away from the site may combine with the proposed development effects in terms of suspended dust. However, the Plasterboard Factory will have a Dust Management Plan, which will mitigate its impact with regard to dust and no significant combined impacts are anticipated.

Disamenity Dust

Process Description

7.10 During phase 2 importation of material will begin with cement or cement substitutes being imported in vessels to the site, stored and distributed onwards in HDVs. The cement or cement substitutes imported on vessels will be unloaded pneumatically and transported via sealed pipes (i.e. fully enclosed) to four storage silos. HDVs would arrive at site and travel on a made road surface to a space beneath the silos (the HDVs will not travel on any unsurfaced roads). A sealed connection will be made between the silos and HDVs and material loaded into the HDVs for onward transportation to off-site locations.

7.11 During phase 3 works, cement clinker will be supplied by vessel and unloaded in a dust-free unloading hopper (equipped with de-dusting filters), from which it will be brought to the clinker storage hall via closed conveyor belt. Also in phase 3, other raw materials (slag, gypsum, limestone, etc.) will also be mainly unloaded via vessel to another hopper and transported via the enclosed conveyor belt at controlled speeds, partly to the storage hall and partly to the open-air storage area.

7.12 The transport of raw materials from the storage areas towards the hoppers of the grinding mill will be done by means of wheel loaders. The material will be discharged onto conveyor belts at the bottom of these hoppers via discharge valves. The material is brought to the grinding mill using a bucket elevator. Clinker, gypsum, limestone and slag are led to the grinding mill via hoppers, equipped with dynamometric cells.

7.13 Once the materials have been transferred to the mill they are processed indoors. The activities that occur within the mill have been considered as part of the point source assessment, as emissions from activities within the building will be vented to the outside via a proposed stack.

7.14 The finished product from the mill will be collected by a bag filter of a high-performance separator and then transported via pipes to the storage silos. Each storage silo has a ground-level exit and is equipped with a dust filter. As mentioned earlier for phase 2, the material produced during phase 3 would be loaded to the HDVs from the silos using a sealed connection and the material within the HDVs will be fully enclosed.

Size of Residual Source Emissions

7.15 For a detailed disamenity dust assessment, the first step is to determine the ‘Size of Residual Source Emissions’ following mitigation. This is primarily based on the amount of material processed, the

levels of mitigation proposed, and mechanisms used to process the material; more details of the criteria used are detailed in Appendix A4.

7.16 Based on the planned operations (see Paragraphs 7.10 to 7.14), three separate dust generating activities have been identified that could impact on nearby sensitive receptors. These are:

- **Materials handling and on-site transportation** including the unloading of the cement clinker and other raw materials delivered by vessel, subsequent handling using heavy plant and use of enclosed conveyors between storage areas and the mill;
- **Stockpiles** of material in the open-air storage area and **storage** of both imported and exported product; and
- **Off-site transportation** of the finished product by HDVs.

7.17 Since the processing of the materials is completed within the mill, the only potential for dust generation during the processing of the materials is via the vertical flue which is assessed separately in Paragraphs 7.24 to 7.25. Thus, residual source emissions associated with material processing is not included below.

7.18 The size of residual source emissions for each activity is stated within Table 13.

Table 13: Size of Residual Source Emissions

Source Identified	Description	Size of Residual Dust Emissions
Materials Handling and On-Site Transportation	Whilst cement and cement substitute will be delivered in phase 2, the handling of this material will all be fully enclosed (i.e. unloaded pneumatically from the vessels and transported via sealed pipes to storage silos) In phase 3, dust-free hoppers (equipped with de-dusting filters) will be used to transport raw material (e.g. cement clinker) and materials will be transported via enclosed conveyor belts. Other raw materials (slag, gypsum, limestone etc.) will also be transported via enclosed conveyors and be handled /transported from the storage areas to the hoppers of the grinding mill via wheel loaders. It has been advised that there will be a maximum of two wheel loaders driving on-site at the same time. All surfaces on which the heavy plant travel will be paved. HDVs will not be used to transport material within the site (only to transport materials off-site dealt with separately below) As such the dust emission magnitude associated with materials handling is judged to be small.	Small
Stockpiles/ exposed surfaces	Some of the materials (slag, gypsum, limestone etc.) will be transferred from the vessels to the open-air storage area. While the exact tonnes of material that will be stored outdoor per annum is unknown, the total material to be imported in phase 3 is expected to be 500,000 tonnes per annum (tpa), and not all of this will be stored outdoors. Thus, dust emission magnitude associated with exposed materials is conservatively judged to be medium.	Medium
Off-site Transportation	It has been advised that on average 92 HDVs will leave the site per day transporting the finished product off-site (i.e. 183 two-way trips associated with the operation of the site). The HDVs will not travel over unpaved ground and the internal paved access road is >50 m in length. The HDVs will be sealed and the connections for unloading materials into the HDVs from storage silos will also be sealed. As such the dust emission magnitude associated with off-site transportation is judged to be small.	Small

Pathway Effectiveness and Receptor Sensitivity

7.19 The next step of the assessment is to determine the 'Pathway Effectiveness' between the dust source and the closest identified receptors. The industrial and ecological receptors used in this assessment are shown in Figure 7. Pathway Effectiveness is determined by combining the distance of the source to the receptors with the frequency of the wind direction likely to transport dust to that receptor during dry days. Five years of weather data from Cardiff weather station (30 km to the southwest of the proposed development) have been used in the assessment. A wind rose can be viewed in Figure 3.

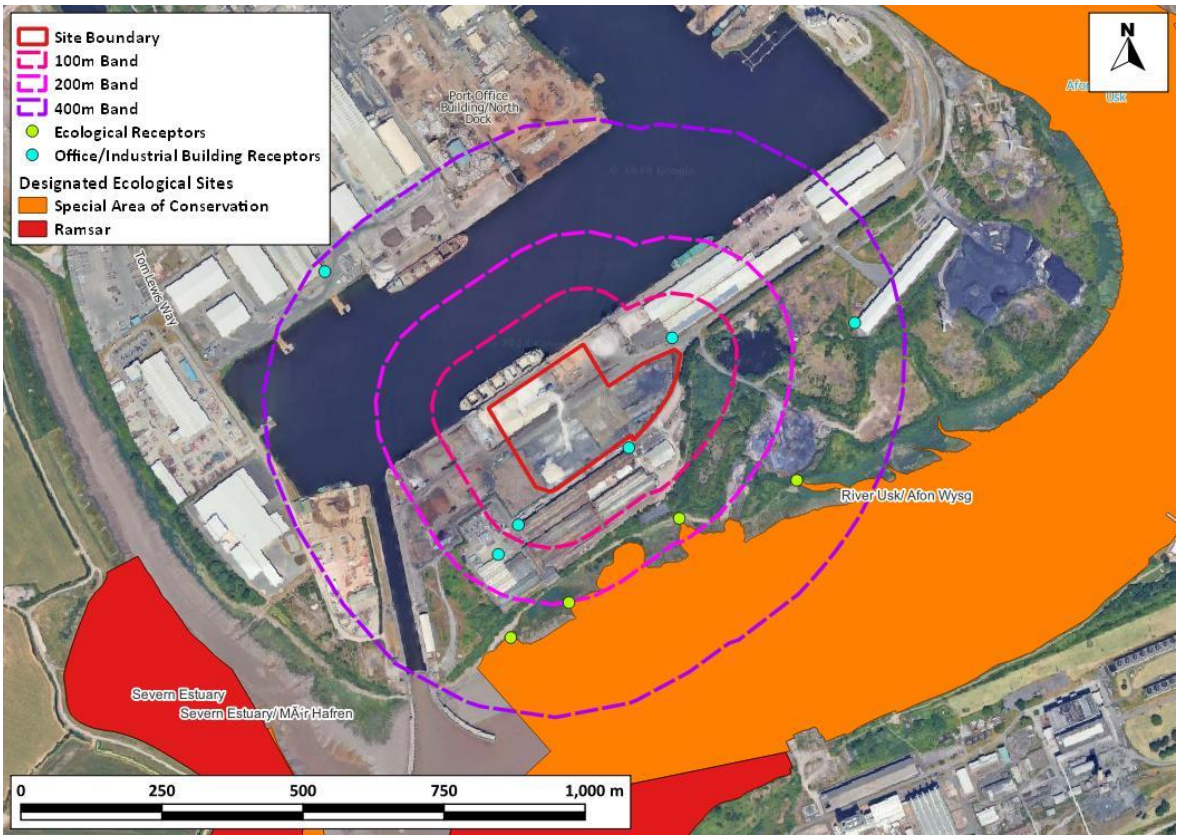

Figure 7: Industrial and Ecological Receptors for Dust Effects within 400 m of the Site Boundary

Imagery ©2024 Airbus, Bluesky, Infoterra ltd & COWI A/S, Maxar Technologies, Map data ©2024 Google.

7.20 The industrial receptors are judged to be low sensitivity receptors to dust disamenity effects since they are already located on industrial sites in the vicinity of existing dust sources. The ecological receptors are assessed as medium sensitivity receptors, as although a SAC is an international designation, the project ecologists (Ramm Sanderson Ecology Ltd) have advised the area of the River Usk SAC near the site will not be of a high sensitivity to dust with the habitats expected to be washed daily due to the intertidal nature of the river.

7.21 Using the methodology detailed in Appendix A4, the distance category from the closest of the above sources to each receptor is presented in Table A4.3. The frequency of the wind direction likely to transport dust to the receptors during dry events and the overall Pathway Effectiveness is presented in Table A4.5 for each receptor.

Table 14: Proximity of Nearby Receptors to the Site of the Proposed Development

Source Identified	Description	Proximity
Ecological Receptor 1	The northern edge of the River Usk SAC, 200 m south of the site.	Intermediate

Source Identified	Description	Proximity
Ecological Receptor 2	The northern edge of the River Usk SAC, 150 m south of the site.	Intermediate
Ecological Receptor 3	The northern edge of the River Usk SAC, 260 m southwest of the site.	Distant
Ecological Receptor 4	The northern edge of the River Usk SAC, 260 m southeast of the site.	Distant
Industrial Receptor 1	Industrial warehouse/office,140 m southwest of the site.	Intermediate
Industrial Receptor 2	Western corner of industrial warehouse/office, 10 m south of the site.	Close
Industrial Receptor 3	Eastern corner of industrial warehouse/office, 10 m south of the site.	Close
Industrial Receptor 4	Industrial warehouse/office, 20 m east of the site.	Close
Industrial Receptor 5	Industrial warehouse/office, 300 m east of the site.	Distant
Industrial Receptor 6	Industrial warehouse/office, 380 m northwest of the site.	Distant

Table 15: Pathway Effectiveness to the Nearby Receptors

Source Identified	Proximity	% Dry Winds (>5 m/s) from Source	Frequency of Potentially Dusty Winds [a]	Pathway Effectiveness
Ecological Receptor 1	Intermediate	0.6	Infrequent	Ineffective
Ecological Receptor 2	Intermediate	4.7	Infrequent	Ineffective
Ecological Receptor 3	Distant	0.5	Infrequent	Ineffective
Ecological Receptor 4	Distant	5.9	Moderately Frequent	Ineffective
Industrial Receptor 1	Intermediate	2.1	Infrequent	Ineffective
Industrial Receptor 2	Close	2.2	Infrequent	Ineffective
Industrial Receptor 3	Close	8.3	Moderately Frequent	Moderately Effective
Industrial Receptor 4	Close	3.6	Infrequent	Ineffective
Industrial Receptor 5	Distant	2.9	Infrequent	Ineffective
Industrial Receptor 6	Distant	1.3	Infrequent	Ineffective

[a] Based on the % of dry winds (>5 m/s) from source. Less than 5% is classed as infrequent, and between 5% and 12% is classed as Moderately Frequent (see Table A4.3).

Assessment of Dust Magnitude Effects

7.22 The final steps are to combine the 'Size of Residual Dust Emissions' with the 'Pathway Effectiveness' and 'Receptor Sensitivity' to estimate the 'Dust Magnitude Effects'. Using the methodology detailed in Appendix A4, the 'Dust Magnitude Effects' are presented in Table A4.7 for the nearby receptors.

Table 16: Dust Magnitude Effects at Each Nearby Receptor

Source Identified	Size of Residual Dust Emissions [a]	Pathway Effectiveness	Dust Impact Risk	Receptors Sensitivity	Dust Magnitude Effects
Ecological Receptor 1	Medium	Ineffective	Negligible Risk	Medium	Negligible Effect
Ecological Receptor 2	Medium	Ineffective	Negligible Risk	Medium	Negligible Effect
Ecological Receptor 3	Medium	Ineffective	Negligible Risk	Medium	Negligible Effect
Ecological Receptor 4	Medium	Ineffective	Negligible Risk	Medium	Negligible Effect
Industrial Receptor 1	Medium	Ineffective	Negligible Risk	Low	Negligible Effect
Industrial Receptor 2	Medium	Ineffective	Negligible Risk	Low	Negligible Effect
Industrial Receptor 3	Medium	Moderately Effective	Low Risk	Low	Negligible Effect
Industrial Receptor 4	Medium	Ineffective	Negligible Risk	Low	Negligible Effect
Industrial Receptor 5	Medium	Ineffective	Negligible Risk	Low	Negligible Effect
Industrial Receptor 6	Medium	Ineffective	Negligible Risk	Low	Negligible Effect

[a] Based on the worst-case magnitude from Table 13.

7.23 In this case, the dust effects are predicted to be a 'Negligible Effect' at all receptors. Based on the IAQM's minerals guidance (IAQM, 2016), a 'Negligible Effect' is considered to be 'not significant'. In addition, vegetation and buildings will act as further barriers to the pathway of dust between the source and the ecological receptors; as such this assessment is deemed to be conservative. Furthermore, good dust management practices during operation, as discussed in Section 8 are likely to reduce the residual dust effects to a minimal level.

Assessment of Operational Point Source Emissions

7.24 Since there are no human receptors within 1 km of the site (see Paragraph 5.1), it is judged that the Defra Industrial Emissions Screening Tool v3.0 (Defra, 2017) can be used to screen out the need for a detailed assessment. The target maximum annual emissions of nitrogen dioxide and PM_{10} in tonnes/year are calculated using the tool for the proposed development stack parameters which are

set out in Appendix A5. The maximum target values for annual nitrogen dioxide and PM_{10} emissions are compared with the estimated 'actual' emissions for the proposed stack presented in Table 17.

Table 17: Maximum Calculated PM_{10} and NO_2 Emissions Compared with Actual Emissions for the Proposed Stack (tonnes per annum)

Pollutant	Emissions Rate (tonnes per annum)	
	Maximum Target Value	'Actual' Estimated Value
Nitrogen dioxide	199.00	3.26
PM_{10}	17.30	2.41

7.25 As shown in Table 17 the estimated 'actual' emissions rates for the proposed stack are well below the target values calculated by the screening tool. As such it is concluded that the potential for significant impacts at existing receptors as a result of emissions from the proposed stack can thus be discounted.

Significance of Operational Air Quality Effects

The operational air quality effects on existing receptors without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendices A2 and A4, and takes account of the assessment that:

- the proposed development will generate traffic below industry screening thresholds for human receptors;
- the impacts of development generated traffic on the saltmarsh habitats within the River Usk and Severn Estuary will be negligible, as detailed further in Appendix A7;
- the operational dust impact assessment has found that dust magnitude effects associated with the proposed development will be *negligible* at all receptors within 400 m of the proposed development; and
- the emissions of nitrogen dioxide and PM_{10} from the proposed point source will be well below the maximum target values as calculated by Defra's screening tool.

8 Mitigation

Good Design and Best Practice

8.1 The EPUK/IAQM guidance advises that good design and best practice measures should be considered, whether or not more specific mitigation is required.

8.2 The proposed development incorporates the following good design and best practice measures, which have been accounted for in the assessment as far as is possible:

- adoption of a Dust Management Plan (DMP) to minimise the environmental impacts of the construction works and operational dust;
- use of exhaust flue for the industrial installation that discharges vertically upwards, unimpeded by any fixture on top of the stack;
- design of exhaust flue so that it discharges at least 10 m above roof level to ensure good dispersion; and
- use of best practice measures for material handling once operational e.g. 'dust free' hoppers with dust filters to unload raw materials on-site, all conveyor belts to be enclosed, transportation of processed materials in sealed pipes / sealed transfer to HDVs etc.

Recommended Mitigation

Construction Impacts

8.3 Measures to mitigate dust emissions will be required during the construction phase of the development in order to minimise effects upon nearby sensitive receptors.

8.4 The site has been identified as a Low Risk site during earthworks and construction and Negligible Risk during trackout for dust soiling, as set out in Table 11. Comprehensive guidance has been published by IAQM (2024) that describes measures that should be employed, as appropriate, to reduce the impacts. This reflects best practice experience and has been used, together with the professional experience of the consultant who has undertaken the dust impact assessment and the findings of the assessment, to draw up a set of measures that should be incorporated into the specification for the works. These measures are described in Appendix A6.

8.5 Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Operational Dust Impacts

Road Traffic Impacts

8.6 The assessment has demonstrated that the overall air quality effect of the proposed development will be 'not significant'; it will not introduce any new exposure into areas of unacceptable air quality, nor will the development-generated traffic emissions have a significant impact on local air quality. It is, therefore, not considered appropriate to propose further mitigation measures for this development.

8.7 Measures to reduce pollutant emissions from road traffic are principally being delivered in the longer term by the introduction of more stringent emissions standards, largely via European legislation (which is written into UK law).

Point Source Impacts

8.8 The screening assessment has demonstrated that the emissions from the industrial installation within the proposed development will be well below the target values calculated by Defra's Industrial Emissions Screening Tool. Given this and that the nearest sensitive receptor is approximately 1 km away, it is judged that it will have an insignificant impact on air quality at the nearest existing properties. As such, there is no requirement for mitigation beyond the best practice design measures highlighted above. This is based on the assumption that the stack installed within the development will, however, meet the specifications set out in Appendix A5; if the installed plant does not conform to these specifications, additional assessment and/or mitigation may be required.

9 Conclusions

9.1 The assessment has considered the impacts of the proposed development on local air quality in terms of dust and particulate matter emissions during both construction and operation, emissions from road traffic generated by the operation of the development, and emissions from the point source emissions associated with the mill. The assessment has been based on measurements made during 2022.

Construction Impacts

9.2 The construction works have the potential to create dust. During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emissions. Appropriate measures have been recommended and, with these measures in place, it is expected that any residual effects will be 'not significant'.

Operational Impacts

9.3 The traffic generated by the proposed development will be below industry screening thresholds for human receptors at locations of relevant exposure. In addition, a detailed assessment of the impact of traffic generation on the ecological receptor of relevant exposure has been completed, which concluded that the impacts will be negligible. As such, development generated traffic will have a negligible impact on air quality conditions on both human and ecological receptors. In addition, the emissions associated with the point source stack on the proposed mill building will be well below the target maximum values calculated by Defra's screening tool, and as such it is judged that it will have a negligible impact on local air quality conditions.

9.4 Assessment of disamenity dust risk has been undertaken based on IAQM Minerals Guidance (IAQM, 2016). The disamenity dust risk assessment has concluded a 'negligible; effect at nearby human and ecological receptors, which is 'not significant' in line with IAQM guidance.

9.5 Overall, the operational air quality effect of the proposed development is judged to be 'not significant' and thus no mitigation, beyond the good design and best practice measures, is required.

Policy Implications

9.6 Taking into account these conclusions, it is judged that the proposed development is consistent with Paragraph 3.21 of PPW12, as it does not have adverse impacts on health, amenity and well-being in terms of its effects on pollution. The proposed development is also consistent with Policy GP2 of the NCC Local Development Plan as there will not be a significant adverse effect on local amenity in terms of air quality. In addition, it is consistent with Policy GP4 as, given the good design measures used as set out in Section 8, the proposed development is designed to minimise air pollution. As required by Policy GP7, the development will not cause or result in unacceptable harm to health because of air pollution.

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11 Glossary

AADT	Annual Average Daily Traffic
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CAZ	Clean Air Zone
CHP	Combined Heat and Power
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
DMP	Dust Management Plan
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK
EU	European Union
EV	Electric Vehicle
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HGV	Heavy Goods Vehicle
HMSO	Her Majesty's Stationery Office
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
kph	Kilometres Per hour
kW	Kilowatt
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)
LGV	Light Goods Vehicle
µg/m^3	Microgrammes per cubic metre
MCPD	Medium Combustion Plant Directive

MW_{th}	Megawatts Thermal
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)
NPPF	National Planning Policy Framework
OEP	Office for Environmental Protection
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
OLEV	Office for Low Emission Vehicles
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
PPW	Planning Policy Wales
RDE	Real Driving Emissions
SPG	Supplementary Planning Guidance
SPD	Supplementary Planning Document
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TAN	Technical Advice Note
TEA	Triethanolamine – used to absorb nitrogen dioxide
WHO	World Health Organisation

12 Appendices

A1 Construction Dust Assessment Procedure

A1.1 The criteria developed by IAQM (2024) divide the activities on construction sites into four types to reflect their different potential impacts. These are:

- demolition;
- earthworks;
- construction; and
- trackout.

A1.2 The assessment procedure includes the four steps summarised below:

STEP 1: Screen the Need for a Detailed Assessment

A1.3 An assessment is required where there is a human receptor within 250 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s), or where there is an ecological receptor within 50 m of the boundary of the site and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s).

A1.4 Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is *negligible* and that any effects will be 'not significant'. No mitigation measures beyond those required by legislation will be required.

STEP 2: Assess the Risk of Dust Impacts

A1.5 A site is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission magnitude (Step 2A); and
- the sensitivity of the area to dust effects (Step 2B).

A1.6 These two factors are combined in Step 2C, which is to determine the risk of dust impacts with no mitigation applied. The risk categories assigned to the site may be different for each of the four potential sources of dust (demolition, earthworks, construction and trackout).

Step 2A – Define the Potential Dust Emission Magnitude

A1.7 Dust emission magnitude is defined as either 'Small', 'Medium', or 'Large'. The IAQM guidance explains that this classification should be based on professional judgement, but provides the examples in Table A1.1.

Table A1.1: Examples of How the Dust Emission Magnitude Class May be Defined

Class	Examples
Demolition	
Large	Total building volume >75,000 m^3, potentially dusty construction material (e.g. concrete), on site crushing and screening, demolition activities >12 m above ground level
Medium	Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material, demolition activities 6-12 m above ground level
Small	Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities <6 m above ground, demolition during wetter months
Earthworks	
Large	Total site area >110,000 m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry to due small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds >6 m in height.
Medium	Total site area 18,000 m^2 – 110,000 m^2, moderately dusty soil type (e.g. silt), 5-10 heavy earth moving vehicles active at any one time, formation of bunds 3 m – 6 m in height.
Small	Total site area <18,000 m^2, soil type with large grain size (e.g. sand), <5 heavy earth moving vehicles active at any one time, formation of bunds <3 m in height.
Construction	
Large	Total building volume >75,000 m^3, on site concrete batching; sandblasting
Medium	Total building volume 12,000 m^3 – 75,000 m^3, potentially dusty construction material (e.g. concrete), on site concrete batching
Small	Total building volume <12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout [a]	
Large	>50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100 m
Medium	20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 m – 100 m
Small	<20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50 m

[a] These numbers are for vehicles that leave the site after moving over unpaved ground.

Step 2B – Define the Sensitivity of the Area

A1.8 The sensitivity of the area is defined taking account of a number of 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 there are natural shelters to reduce the risk of wind-blown dust.

A1.9 The first requirement is to determine the specific sensitivities of local receptors. The IAQM guidance recommends that this should be based on professional judgment, taking account of the principles in

Table A1.2. These receptor sensitivities are then used in the matrices set out in Table A1.3, Table A1.4 and Table A1.5 to determine the sensitivity of the area. Finally, the sensitivity of the area is considered in relation to any other site-specific factors, such as the presence of natural shelters etc., and any required adjustments to the defined sensitivities are made.

Step 2C – Define the Risk of Impacts

A1.10 The dust emission magnitude determined at Step 2A is combined with the sensitivity of the area determined at Step 2B to determine the *risk* of impacts with no mitigation applied. The IAQM guidance provides the matrix in Table A1.6 as a method of assigning the level of risk for each activity.

STEP 3: Determine Site-specific Mitigation Requirements

A1.11 The IAQM guidance provides a suite of recommended and desirable mitigation measures which are organised according to whether the outcome of Step 2 indicates a low, medium, or high risk. The list provided in the IAQM guidance has been used as the basis for the requirements set out in Appendix A6.

STEP 4: Determine Significant Effects

A1.12 The IAQM guidance does not provide a method for assessing the significance of effects before mitigation, and advises that pre-mitigation significance should not be determined. With appropriate mitigation in place, the IAQM guidance is clear that the residual effect will normally be 'not significant'.

A1.13 The IAQM guidance recognises that, even with a rigorous dust management plan in place, it is not possible to guarantee that the dust mitigation measures will be effective all of the time, for instance under adverse weather conditions. The local community may therefore experience occasional, short-term dust annoyance. The scale of this would not normally be considered sufficient to change the conclusion that the effects will be 'not significant'.

Table A1.2: Principles to be Used When Defining Receptor Sensitivities

Class	Principles	Examples
Sensitivities of People to Dust Soiling Effects		
High	users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and 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	dwellings, museum and other culturally important collections, medium and long term car parks and car showrooms
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; or the appearance, aesthetics or value of their property could be diminished by soiling; or 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	parks and places of work
Low	the enjoyment of amenity would not reasonably be expected; or there is property that would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or 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	playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads
Sensitivities of People to the Health Effects of PM_{10}		
High	locations where members of the public may be exposed for eight hours or more in a day	residential properties, hospitals, schools and residential care homes
Medium	locations where the people exposed are workers, and where individuals may be exposed for eight hours or more in a day.	may include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}
Low	locations where human exposure is transient	public footpaths, playing fields, parks and shopping streets
Sensitivities of Receptors to Ecological Effects		
High	locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particularly dust sensitive species	Special Areas of Conservation with dust sensitive features
Medium	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	Sites of Special Scientific Interest with dust sensitive features
Low	locations with a local designation where the features may be affected by dust deposition	Local Nature Reserves with dust sensitive features

Table A1.3: Sensitivity of the Area to Dust Soiling Effects on People and Property [3]

Receptor Sensitivity	Number of Receptors	Distance from the 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 A1.4: Sensitivity of the Area to Human Health Effects [3]

Receptor Sensitivity	Annual Mean PM_{10}	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

[3] For demolition, earthworks and construction, distances are taken either from the dust source or from the boundary of the site. For trackout, distances are measured from the sides of roads used by construction traffic. Without mitigation, trackout may occur from roads up to 250 m, as measured from the site exit. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50 m from the edge of the road.

Table A1.5: Sensitivity of the Area to Ecological Effects [3]

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

Table A1.6: Defining the Risk of Dust Impacts

Sensitivity of the 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
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

A2 EPUK & IAQM Planning for Air Quality Guidance

A2.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

"Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations".*

Recommended Best Practice

A2.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

"The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions".

A2.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m^2 of commercial floorspace;
- are carried out on land of 1 ha or more.

A2.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new "street canyon", as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 m^2 of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
    - Spark ignition engine: 250 mgNOx/Nm^3;
    - Compression ignition engine: 400 mgNOx/Nm^3;
    - Gas turbine: 50 mgNOx/Nm^3.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNOx/Nm^3 and 25 mgPM/Nm^3.

A2.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

"It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the "damage cost approach" used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential".

A2.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

"There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- *the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- *the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- *the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- *the presence of a source of odour and/or dust that may affect amenity for future occupants of the development".*

Impacts of the Development on the Local Area

A2.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m^2 of floor space for all other uses or a site area greater than 1 ha.

A2.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

A2.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of roads (i.e. changing the proximity of receptors to traffic lanes) where the change is 5m or more and the road is within an AQMA;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A2.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A2.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

"Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm^3.

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

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

A2.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".

A2.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

"The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer".

A2.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

A2.15 There is no official guidance in the UK in relation to development control on how to describe the nature of air quality impacts, nor how to assess their significance. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. This approach involves a two stage process:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts.

A2.16 The guidance recommends that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

- the existing and future air quality in the absence of the development;
- the extent of current and future population exposure to the impacts;
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts;
- the potential for cumulative impacts and, in such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

A2.17 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant. For people working at new developments in this situation, the same will not be true as occupational exposure standards are different, although any assessment may wish to draw attention to the undesirability of the exposure.

A2.18 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A3.

A3 Professional Experience

Penny Wilson, BSc (Hons) CSci MIEnvSc MIAQM

Ms Wilson is a Technical Director with AQC, with more than 20 years' relevant experience in the field of air quality. She has been responsible for numerous assessments for a range of infrastructure developments including power stations, road schemes, ports, airports and residential/commercial developments. The assessments have covered operational and construction impacts, including dust and odour nuisance. She also provides services to local authorities in support of their LAQM duties, including the preparation of Review and Assessment and Action Plan reports, as well as audits of Air Quality Assessments submitted with planning and DCO applications. She has provided expert evidence to a number of Public Inquiries and civil court, and is a Member of the Institute of Air Quality Management and a Chartered Scientist.

Anna McMahon, BSc (Hons) MSc CEnv MIEnvSc MIAQM

Ms McMahon is a Principal Consultant with AQC with over 12 years' relevant experience. She has undertaken air quality assessments for a range of sectors including residential, commercial, industrial and highways. She has extensive experience of quantitative methods to assess road traffic and stationary source emissions utilising detailed dispersion modelling software such as ADMS Roads, ADMS-5 and Breeze AERMOD, for both planning and permitting purposes. She also has experience in ambient air quality monitoring, the analysis and interpretation of air quality monitoring data, the assessment of nuisance dust and odours and indoor air quality for BREEAM. Anna is a Member of the Institute of Air Quality Management and is a Chartered Environmentalist.

Meg Saunders, BSc MSc

Miss Saunders is an Assistant Consultant with AQC and joined the company in 2023. During her MSc degree in Sustainability Science and Practice at Stanford University, she joined Stanford Future Bay Initiative, completing project work related to extreme heat forecasting. She went on to complete a summer internship focussed on developing the foundations for an open-source methodology for urban air quality modelling in collaboration with community partners in the Bay Area. Her master's practicum project with the NGO Groundwater Collaborative analysed data relevant to sustainable groundwater management in California.

A4 Mineral Dust Assessment Procedure

A4.1 The guidance developed by the IAQM on the Assessment of Mineral Dust Impacts for Planning (IAQM, 2016), provides criteria to screen the need for a detailed assessed, and, if required, a suggested approach to the detailed assessment of mineral developments.

Screening Assessment

A4.2 The guidance sets out screening criteria that can be used to determine whether a detailed air quality assessment is required.

A4.3 If there are no relevant receptors within 1 km of the operations, then a detailed dust assessment can be screened out. In such a case, it is considered that irrespective of the nature, size and operation of the site, the risk of an impact is likely to be “negligible” and any resulting effects are likely to be ‘not significant’.

A4.4 In cases whereby receptors are located between 400 m, or 250 m (depending on the rock type) and 1 km of operations, it would normally be assumed that a detailed disamenity dust impact assessment is not required. However, the decision on whether to assess should be made and justified on a site-specific basis by a suitably experienced air quality professional taking into account local factors.

A4.5 If there are relevant human and / or ecological receptors within 250 m or 400 m (depending on the rock type) then a disamenity dust impact assessment will almost always be required. This step is deliberately chosen to be conservative (and will in practice result in assessments being required for most minerals development schemes).

Detailed Assessment

A4.6 If a detailed assessment is required the guidance describes the assessment approach in three steps, which are described in detail in the sections below.

Table A4.1: Detailed Assessment Steps

Step	Action	Consideration
Step 1	Describe Site Characteristics and Baseline Conditions	Such as extent of site boundary, operations, mineral type, production rate, working method, scale and duration of works, consideration of existing baseline conditions and dust sources
Step 2	Estimate Dust Risk	Consideration of pathway effectiveness and residual source emissions
Step 3	Estimate Likely Magnitude of Effect	Consideration of dust impact risk and receptor sensitivity

Step 2

Determination of Residual Source Emissions

A4.7 The residual source emission is determined considering site characteristics and the potential for emissions from each source, taking into account designed-in mitigation measures.

A4.8 As stated within the guidance the following factors should be considered:

- the activities being undertaken (blasting, crushing, screening, methods of handling and storage etc.);
- the types and properties of the materials involved;
- the size of the site and, specifically, the area of land being worked (and hence the quantities of materials involved and the number of vehicles and plant etc.);
- the durations and frequencies of the activities;
- the likely effectiveness of the dust control measures incorporated into the design of the submitted development scheme, including design features, management controls (ideally formalised within a Dust Management Plan) and, where appropriate, engineering controls;
- other mitigation measures applied to reduce or eliminate dust; and
- the meteorological conditions that can promote or inhibit the raising of dust at the source (high winds and rainfall, respectively).

A4.9 The guidance provides examples illustrating factors that need to be considered when making a professional judgement as to the residual source emissions.

Table A4.2: Factors to Consider When Determining Residual Source Emissions

Source Activity	Factor for Consideration
Site Preparation/Restoration	Size of working area
	Height of bunds
	Volume of Material movement
	No. of heavy plant
	Whether bunds are seeded or sealed
	Potential of material for dust generation
Mineral Extraction	Size of working area
	Extraction method (low or high energy)
	Potential of material for dust generation
Materials Handling	No. of heavy plant
	Type of surface (paved or unconsolidated)

Source Activity	Factor for Consideration
	Distance of activities to site boundary (or in void)
	Potential of material for dust generation
On-site Transportation	Transport method (un-consolidated haul road or use of conveyors)
	Type of haul road (unpaved or paved)
	Dust potential of road surface
	No. of heavy vehicle movements
	Length of haul roads
	Vehicle speed (controlled or uncontrolled)
Mineral Processing	Potential of raw material for dust generation
	Potential of end product for dust generation
	Complexity of process
	Volume of material processed
Stockpiles/exposed surfaces	Length of stockpile storage
	Frequency of material transfer
	Potential of raw material for dust generation
	Type of surface (paved or unconsolidated)
	Distance of stockpiles to site boundary (or in void)
	Area of exposed surfaces
	Wind speed and dust threshold
Off-site Transportation	No. of HGV movements
	Type of Access Road (unpaved or paved)
	Vehicle cleaning facility provision
	Length of access road

Estimation of Pathway Effectiveness

A4.10 The effectiveness of pathway is determined based on site-specific factors considering the distance and direction of each receptor relative to the prevailing wind direction. The frequencies of wind in each direction are calculated based on meteorological data for five years from a nearby meteorological station. The frequency of exposure of receptors to moderate to high winds from the direction of the source is categorised as detailed in Table A4.3 and the distance of the receptor to source as detailed within Table A4.4. Consideration of topography and physical features is also required.

Table A4.3: Categorisation of Frequency of Potentially Dusty Winds

Frequency Category	Criteria
Infrequent	Frequency of winds (>5m/s) from the direction of the dust source on all days are less than 5%
Moderately frequent	The frequency of winds (>5m/s) from the direction of the dust source on dry days are between 5% and 12%
Frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are between 12% and 20%
Very frequent	The frequency of winds (>5 m/s) from the direction of the dust source on dry days are greater than 20%

Table A4.4: Categorisation of Receptor Distance from Source

Category	Criteria
Distant	Receptor is between 200 m and 400 m from the dust source
Intermediate	Receptor is between 100 m and 200 m from the dust source
Close	Receptor is less than 100 m from the dust source

A4.11 The resulting pathway effectiveness for each receptor is identified using the criteria in Table A4.3 and A4.4 as shown in Table A4.5.

Table A4.5: Pathway Effectiveness

		Frequency of potentially dusty winds			
		Infrequent	**Moderately frequent**	**Frequent**	**Very frequent**
Receptor Distance Category	**Close**	Ineffective	Moderately Effective	Highly Effective	Highly Effective
	Intermediate	Ineffective	Moderately Effective	Moderately Effective	Highly Effective
	Distant	Ineffective	Ineffective	Moderately Effective	Moderately Effective

A4.12 The risk ratings for residual source emissions and pathway effectiveness (for each receptor) identified using the criteria in Table A4.2 and Table A4.5 are then combined using the matrix shown in A4.6 to estimate an overall risk of dust impact at each specific receptor location.

Table A4.6: Estimation of Dust Impact Risk

		Residual Source Emissions		
		Small	**Medium**	**Large**
Pathway Effectiveness	**Highly effective pathway**	Low Risk	Medium Risk	High Risk
	Moderately effective pathway	Negligible Risk	Low Risk	Medium Risk
	Ineffective pathway	Negligible Risk	Negligible Risk	Low Risk

Step 3

A4.13 The next stage of the risk assessment is to identify the potential dust effect at each receptor location. This is done using the matrix presented in Table A4.7, which combines the overall dust impact risk descriptor for each receptor with the receptor sensitivity.

Table A4.7: Assessment of Dust Magnitude of effects

		Receptor Sensitivity		
		Low	**Medium**	**High**
Dust Impact Risk	**High Risk**	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
	Medium Risk	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
	Low Risk	Negligible Effect	Negligible Effect	Slight Adverse Effect
	Negligible Risk	Negligible Effect	Negligible Effect	Negligible Effect

A4.14 As a final stage of assessment, an overall significance of dust effects is determined, based on professional judgment and taking into account the significance of effect at each specific receptor location for each activity.

A5 Point Source Emissions Data

A5.1 The proposed development will both grind raw material into fine material, and heat and dry raw material with a single stack as a point source from the mill. The fuel-type and specifications for the stack are currently unknown. However, stack parameters for the proposed development stack and emission measurements data, for an existing industrial installation with the same function in Ghent, Belgium, have been provided by client. These data have been used as a proxy to assess the screening emissions rates for the proposed industrial installation and are shown in Table A5.1 .

Table A5.1: Stack Parameters

Parameter	Value
Stack Diameter (m) [a]	**2**
Stack Height (m) [a]	**46**
Stack Exit Temperature (°C) [b]	**< 100**
Building Height (m) [a]	**36**
NO_2 Background Concentration (µg/m^3) [c]	**15**
PM_{10} Background Concentration (µg/m^3) [c]	**13**
NO_x as NO_2 Emission Rate (g/h) [b]	**378**
PM_{10} Emission rate (g/h) [b]	**279**

[a] Parameters for the proposed stack

[b] Proxy data taken from emission measurements at a similar existing industrial installation in Ghent, Belgium.

[c] These concentrations were measured by St Julian's AURN monitoring site and published in NCC's Annual Progress Report (Newport City Council, 2023b).

A5.2 If the design of the proposed stack deviates significantly from the parameters presented in Table A5.1, additional future modelling may be required in order to ensure that there are no significant adverse air quality impacts.

A5.3 The following measures should be adhered to in order to ensure adequate dispersion of emissions from discharging stacks and vents. These include the following, all of which are complied with for the proposed development:

- discharges should be vertically upwards and unimpeded by cowls or any other fixtures on top of the stack. However, the use of coning or of flame traps at the tops of stacks is acceptable. In the case of discharge stacks (whether single or multiple stack) with shrouds or casings around the stack(s), the stack(s) alone should extend above the shroud or casing. This extension should be at least 50% of the shroud or casing's greatest lateral dimension;
- irrespective of the pollutant discharge, there are minimum discharge stack heights based on the heat release and the discharge momentum;

- no discharge stack should be less than 3 m above the ground or any adjacent area to which there is general access. For example, roof areas and elevated walkways;
- a discharge stack should never be less than the height of any building within a distance of 5 times the stack height; and
- a discharge stack should be at least 3 m above any opening windows or ventilation air inlets within a distance of 5 times the stack height.

A6 Construction Mitigation

A6.1 Table A6.1 sets out a list of best-practice measures from the IAQM guidance (IAQM, 2024) that should be incorporated into the specification for the works. These measures should ideally be written into a Dust Management Plan. Some of the measures may only be necessary during specific phases of work, or during activities with a high potential to produce dust, and the list should be refined and expanded upon in liaison with the construction contractor when producing the Dust Management Plan.

Table A6.1: Best-Practice Mitigation Measures Recommended for the Works

Measure	Desirable	Highly Recommended
Communications		
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environmental manager/engineer or the site manager		✓
Display the head or regional office contact information		✓
Dust Management Plan		
Develop and implement a Dust Management Plan (DMP) approved by the Local Authority which documents the mitigation measures to be applied, and the procedures for their implementation and management	✓	
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, and the action taken to resolve the situation in the log book		✓
Monitoring		
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		✓
Preparing and Maintaining the Site		
Plan the 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 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 Vehicle/Machinery and Sustainable Travel		
Ensure all vehicles switch off their 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 un-surfaced haul roads and work areas	✓	
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, conveyors and covered skips		✓
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate		✓
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods	✓	
Waste Management		
Avoid bonfires and burning of waste materials		✓
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	✓	
Measures Specific to Trackout		
Avoid dry sweeping of large areas	✓	
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport	✓	

A7 Detailed Biodiversity Assessment of Road Traffic Impacts on the River Usk SAC

Report

Biodiversity Air Quality Screening Assessment

South Dock, Alexandra Docks, Newport Air Quality Assessment

For Stephenson Halliday

2 September 2024

Air Quality CONSULTANTS | PART OF Logika Group

Document Control

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1 Introduction

1.1 This report describes a screening assessment for air quality effects on biodiversity associated with operational phase traffic of the proposed industrial development at South Dock, Alexandra Docks, Newport. It accompanies AQC report J10/14834A/10/F4 which considers the air quality effects of the proposed development during both the construction and operational phases. Since the main air quality assessment was originally prepared, the project transport consultants (SCP Transport Planning) have provided revised traffic data. The revised traffic data are greater and, therefore, further consideration of potential air quality effects on biodiversity has been considered necessary and is presented within this report.

1.2 The proposed development is within 160 m of the River Usk Special Area of Conservation (SAC)/Site of Special Scientific Interest (SSSI) and within 500 m of the River Severn Estuary Ramsar/Special Protection Area (SPA)/SSSI and within 3 km of the nearest Air Quality Management Area (AQMA).

1.3 The location of the proposed development is shown in Figure 1.1, along with the nearby ecological receptors.

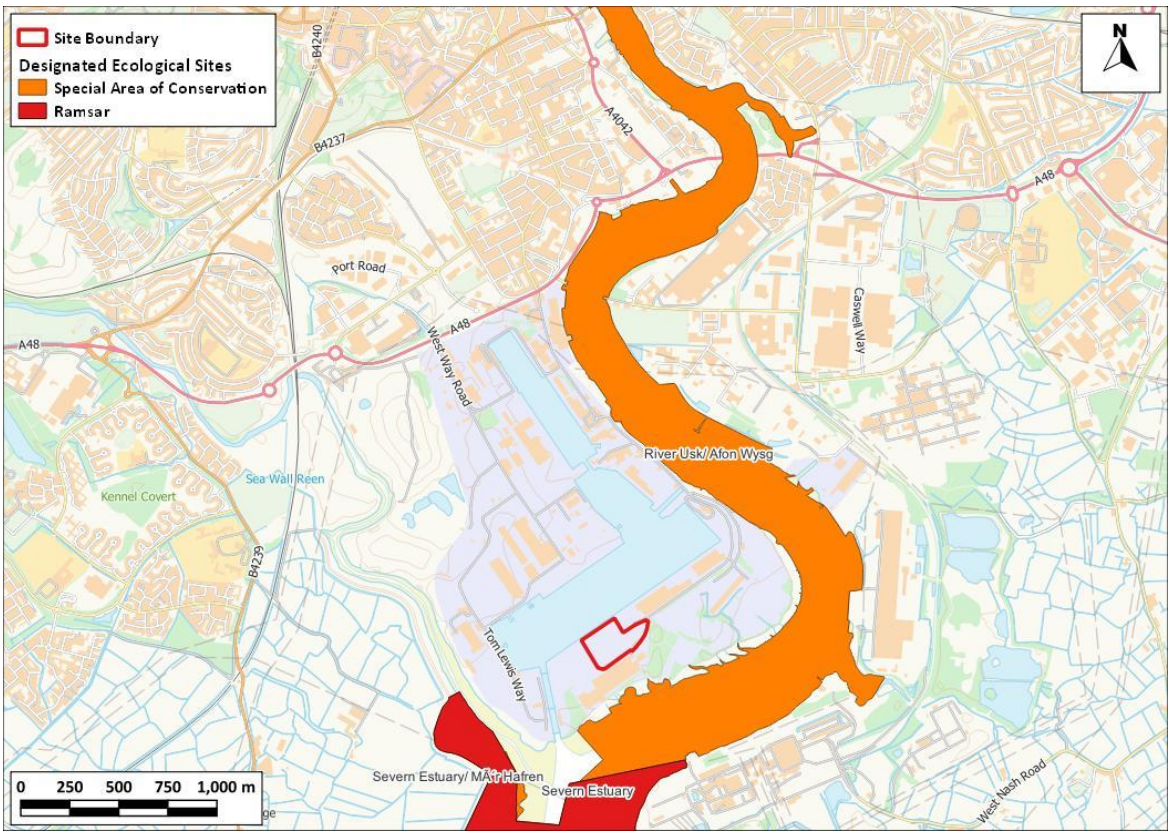

Figure 1.1: Proposed Development Setting

1.4 The proposed development will lead to changes in traffic flows on roads which pass within 200 m of the River Usk SAC. The proposed development will not lead to a change in traffic flows on roads within 200 m of the River Severn SPA. Road traffic can emit nitrogen oxides (NOx) and ammonia, and some sensitive vegetation may be affected by elevated concentrations of these pollutants.

Furthermore, the deposition of both NOx and ammonia can alter the nutrient and acidity balance of some ecosystems, causing changes to their composition and health. It has been advised by the project ecologists (Ramm Sanderson Ecology Ltd) that the only part of the SAC within 200 m of the relevant roads which is sensitive to nitrogen deposition is an area of salt marsh habitat, extending up to the A48 as shown in Figure 1.2. This assessment has quantified the changes to NOx and ammonia concentrations that would be caused by the proposed development within this sensitive area, as well as the changes to nitrogen and acid deposition fluxes.

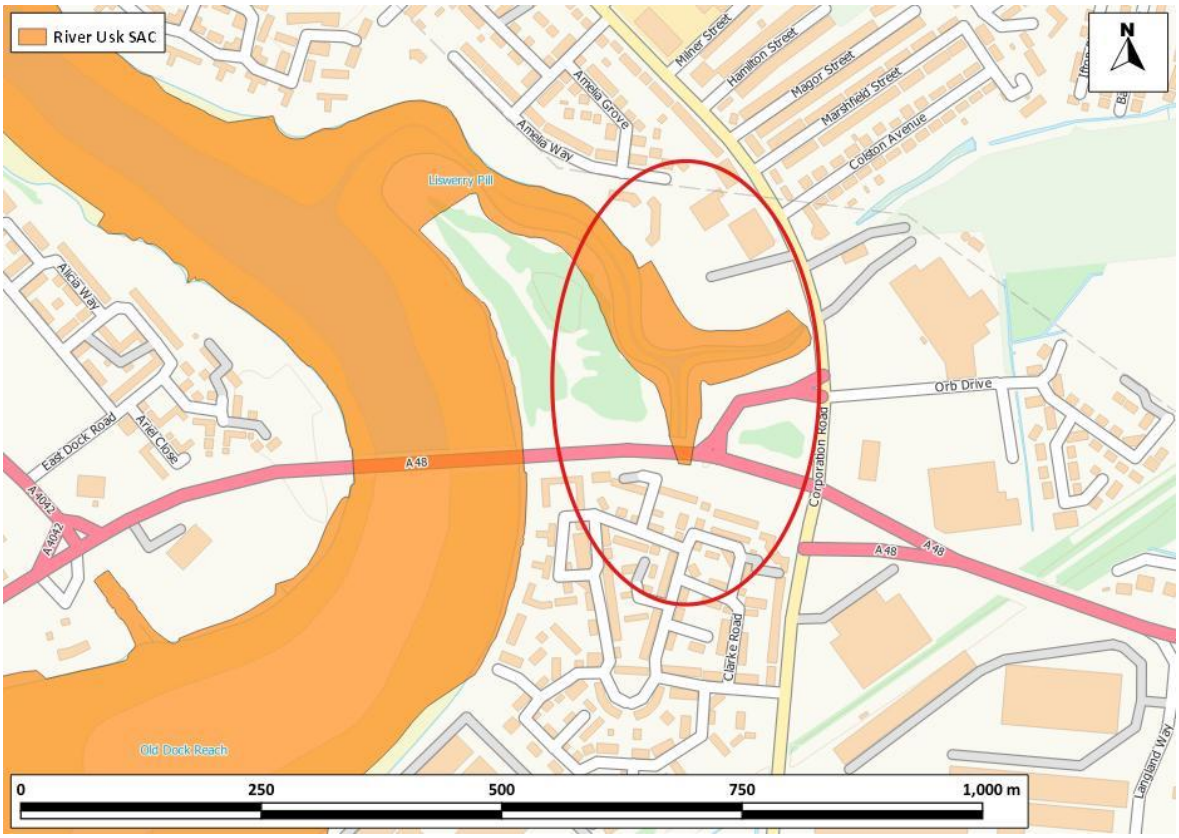

Figure 1.2: Salt Marsh Area of the River Usk Sensitive to Nitrogen Deposition

1.5 In this report, the term 'impact' refers to a change to concentrations or deposition fluxes, while the term 'effect' refers to the consequence of that change. Because this is a screening report, the approach has been to consider changes to air quality and deposition in the context of *potential* effects on ecosystem health. This has relied on published and commonly accepted screening criteria which make worst-case assumptions regarding the sensitivity of any given habitat to air pollution effects. This assessment does not extend to defining the specific sensitivity of the habitats in practice and is thus worst-case.

1.6 This report describes existing local air quality conditions (base year 2022), and the predicted air quality in the future assuming that the proposed development does, or does not proceed. The assessment of traffic-related impacts focuses on 2028, which is the anticipated year of operation for phase 3 of the proposed development. Phase 3 is when the greatest heavy duty vehicle (HDV) movements are anticipated for the proposed development (for further details see AQC report ref: J10/14834A/10/F4).

1.7 This report has been prepared taking into account all relevant local and national guidance. The professional experience of the consultants involved in the assessment is summarised in the main report (ref: J10/14834A/10/F4) Appendix A3.

2 Policy Context

2.1 Protection of nature conservation sites is provided by an array of different national and international policies. This effectively provides different levels of protection to different types of sites, as outlined below.

European Sites

2.2 The Habitats Directive (European Council Directive 92/43/EEC, 1992) requires all European member states to introduce a range of measures for the protection of habitats and species. Conservation of Habitats and Species Regulations (2017) ('the Habitats Regulations') transpose the Directive into UK law. Changes to the Habitats Regulations in 2021 (Defra, 2021) transferred functions from the European Commission to the appropriate UK authorities.

2.3 The following European sites are protected by the Habitats Regulations and any proposals that could affect them will require a Habitats Regulations Assessment ('HRA'):

- Special Areas of Conservation (SACs), which are designated because of their importance for specific habitats or species listed in the Directive;
- Special Protection Areas (SPAs), which are designated for the protection of birds under the "Birds Directive" (Directive 2009/147/EC, 2009), implemented in UK law through the Conservation of Habitats and Species Regulations (2010).;
- Ramsar Sites. Originally intended to protect waterfowl habitat, the Ramsar Convention has broadened its scope to cover all aspects of wetland conservation;
- proposed SACs and SPAs (often termed cSAC and cSPA); and
- areas secured as sites compensating for damage to a European Site

2.4 In practice, it is not uncommon for the same area of land to be covered by more than one designation.

2.5 The Habitats Regulations require competent authorities (in this case Newport City Council) to only allow new projects (e.g. individual developments seeking planning permission) or plans (e.g. local plans) having first ascertained that they will not adversely affect the integrity of a European site either alone or 'in-combination' with other projects and plans.

2.6 HRA refers to the process of assessment required under the Regulations, which is commonly described as four distinct stages (e.g. the Planning Inspectorate (2017)):

- Stage 1 - screening;
- Stage 2 - Appropriate Assessment ('AA'),
- Stage 3 - assessment of alternatives, and
- Stage 4 - assessment of Imperative Reasons of Overriding Public Interest ('IROPI').

2.7 Not all stages are required for most projects or plans. In particular, if the screening stage can show that the project will not have a Likely Significant Effect ('LSE') on the interest features either alone or in-combination with other plans and projects then an AA is not required. This report considers the screening stage only but also contains information which may be used in subsequent stages of the assessment where needed.

2.8 An effect is 'significant' if it undermines the conservation objectives. Before granting planning permission, decision makers must be satisfied that no reasonable scientific doubt remains as to the absence of adverse effects to site integrity.

2.9 Interpretation of the Habitats Regulations with respect to air quality impacts and effects has been shaped by judgements and opinions of European and UK courts, and a brief summary of some relevant case law is provided in Appendix A7.1. These Judgements and Opinions have highlighted the extent to which the Directive, and therefore Regulations, require a precautionary approach. However, the Courts have also recognised that there is no such thing as absolute certainty. This is particularly important with air quality modelling, which is always uncertain, with this uncertainty impossible to quantify precisely. Decision makers must identify reasonably foreseeable risks based on information that can readily be obtained. The courts have also established that, whilst a risk is sufficient to constrain development under the Habitats Regulations, there must be credible evidence that this risk is real, rather hypothetical (see Paragraph A1.3).

2.10 UK interpretation of the Habitats Regulations has also been shaped by guidance given by Natural England (NE) to local planning authorities and the Planning Inspectorate. A key area where this prior advice is important is the reliance which should be placed on forecast reductions in emissions from road traffic and other sectors over time. Measures which are expected to improve air quality in the future which are unrelated to a plan or project being determined are described as 'autonomous measures', and the forecast improvements resulting from these measures are termed 'autonomous reductions'. Paragraphs A1.9 to A1.14 in Appendix A7.1 explain that there are significant risks to local planning authorities if they do not adequately take account of the ability of autonomous reductions to offset and negate adverse changes caused by new plans and projects.

Sites of National and Local Importance

2.11 Sites of national importance are designated as Sites of Special Scientific Interest (SSSIs). Originally notified under the National Parks and Access to the Countryside Act (1949), SSSIs have been re-notified under the Wildlife and Countryside Act (1981). Improved provisions for the protection and management of SSSIs (in England and Wales) were introduced by the Countryside and Rights of Way Act (2000) (the "CROW" act). If a development is "*likely to damage*" a SSSI, the CROW act requires that a relevant conservation body (in this case Natural Resources Wales (NRW)) is consulted.

2.12 The CROW act also provides protection to local nature conservation sites, which can be particularly important in providing 'stepping stones' or 'buffers' to SSSIs and European sites. A broad range of site designations are included under the umbrella term of 'sites of local importance'. They are largely non-statutory designations, with sites identified by the local authority, the Wildlife Trusts, or other local groups. An ancient woodland inventory is provided by NRW to identify the locations of the main historic woodlands. It is important to note, however, that local site designations, including ancient woodlands, are frequently updated and that there is no single published database which includes all sites. It is thus necessary to apply professional judgement in determining the key locations where a proposed project might have air quality effects, noting that sites which are both highly sensitive and highly valuable would be expected to be designated as being of national or international importance.

2.13 The CROW act is less prescriptive than the Habitats Regulations in terms of assessment approach. In particular, the requirement to ensure the absence of LSE in combination with other plans and projects is specific to the Regulations (and thus to European sites). This does not, however, mean that other plans and projects may be ignored with respect to impacts on nationally- and locally-designated sites. Planning policy (see the next section) defines the main assessment requirements with respect to the impacts of new developments on sites of national and local importance.

Planning Policy

National Policies

2.14 Land-use planning policy in Wales is established within the policy document Planning Policy Wales (PPW12) (Welsh Government, 2024), which provides the strategic policy framework for the effective preparation of local planning authority development plans. The PPW12 translates the principles of the Sustainable Management of Natural Resources (SMNR) into use for the planning system, which includes '*halting and reversing loss of biodiversity*' as a key feature. Chapter 6: Distinctive and Natural Places highlight the importance of protecting, maintaining and enhancing biodiversity as part of the planning process.

2.15 Paragraph 6.71 of the PPW12 notes:

"*…air quality, noise and light pollution can have negative effects on people, biodiversity and resilience of ecosystems and should be reduced as far as possible.*"

2.16 PPW12 places a general presumption in favour of sustainable development, stressing the importance of local development plans, and states that the planning system should perform an environmental role to minimise pollution. Local development plans should enable consideration of the effects that the proposed development may have on air quality, as well as the effect that air quality may have on the proposed development. To prevent unacceptable risks from air pollution, planning decisions should ensure that new development is appropriate for its location, and states:

2.17 "*Development should prevent problems from occurring or getting worse such as the generation of carbon emissions, poor air quality and waste and the depletion of our natural resources which will need to be managed for many years to come.*"

Local Policies

2.18 The Local Development Plan 2011-2026 (Newport City Council, 2015b) was adopted by Newport City Council in January 2015, and within this Policy SP8 on Special Landscape Areas (SLA) references the River Usk and states that:

"*Developers will be required to ensure that proposals do not impact or affect the intrinsic character, quality, feature or conservation value of the SLA. Designs will be required to be of a high standard, appropriate in scale and massing, integrated sympathetically into the landscape as well as ensuring long term management.*"

2.19 Policy GP5 on General Development Principles – Natural Environment includes a point relevant to Nature Conservation Designations and includes a point about biodiversity:

"*Development will be permitted where, as applicable:*

[…] ii) The proposals demonstrate how they avoid, or mitigate and compensate negative impacts to biodiversity, ensuring that there are no significant adverse effects on areas of nature conservation interest including international, European, national, Welsh section 42 and local protected habitats and species, and protecting features of importance for ecology."

3 Critical Levels and Critical Loads

3.1 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets a limit value for annual mean concentrations of nitrogen oxides and for annual and winter mean concentrations of sulphur dioxide. The same values have been set as domestic objectives within the Air Quality (Wales) Regulations (2000) and the Air Quality (Wales) (Amendment) Regulations (2002). The limit values and objectives only apply a) more than 20 km from an agglomeration (about 250,000 people), and b) more than 5 km from Part A industrial sources, motorways and built-up areas of more than 5,000 people.

3.2 Critical levels (CLes) and critical loads (CLos) are the ambient concentrations and deposition fluxes below which significant harmful effects to sensitive ecosystems are unlikely to occur. Some of the CLes are set at the same concentrations as the objectives but do not have the same spatial constraints on where they apply. Exceedances of the CLes and CLos are considered in the context of preventing harm to sites which are protected under the various designation frameworks outlined in Section 2. The CLes relevant to this assessment are set out in Table 1. The CLos are specific to different habitat types, and those which are most relevant to this assessment are provided in Table 2. The River Usk SAC designation includes Atlantic salt marsh, and within a saltmarsh different zones can be distinguished based on flooding frequency. As the flooding frequency of the study area is unknown, the more conservative CLos (i.e. lower) for upper-mid & mid-low salt marshes have been selected for use within this assessment.

Table 1: Vegetation and Ecosystem CLes [a]

Pollutant	Time Period	CLe
Nitrogen Oxides (expressed as NO_2)	Annual Mean [a,b]	30 µg/m^3
	24-Hour Mean [a,c]	75 (200[d]) µg/m^3
Ammonia	Annual Mean	3 µg/m^3 [e]

[a] The CLes are defined by the World Health Organisation (WHO, 2000).

[b] Away from major sources (see Paragraph 3.1), this CLe is set as an objective (Defra, 2007) and a limit value (The European Parliament and the Council of the European Union, 2008).

[c] This CLe is not an objective and thus does not have the same legal standing.

[d] The CLe is 75 µg/m^3 but Natural England and the Institute of Air Quality Management (IAQM) both recommend that a value of 200 µg/m^3 is usually more appropriate for current UK conditions. The current assessment considers values of both 75 µg/m^3 and 200 µg/m^3.

[e] A more stringent CLe of 1 µg/m^3 only applies where lichens or bryophytes are present or form a key part of the ecosystem integrity. The NRW open data maps (Natural Resources Wales, 2024) for air quality and habitats advises there are no nitrogen sensitive lichens or bryophytes in the study area and therefore 3 µg/m^3 is the appropriate CLe for the assessment.

Table 2: Vegetation and Ecosystem CLos [a]

Habitat Type	Nutrient Nitrogen (kgN/ha/yr)	Acid Deposition 'N_{max}' (keq/ha/yr)
Atlantic upper-mid & mid-low salt marshes	10	4.0 [b]

[a] CLos for nutrient nitrogen and acid deposition taken from (APIS, 2024). N_{max} is the value above which additional nitrogen deposition will lead to an exceedance.

[b] APIS advises there is no comparable acid critical load class for which the CL function is calculated. Therefore, the soil base empirical CL (based on the dominant soil) for the grid square considered within the assessment has been used.

4 Relevant Guidance

4.1 Different organisations have issued assessment guidance and screening criteria for different types of emissions source and different site designations. This has resulted in different levels of protection being provided with respect to effects of the same pollutants on the same sites. There is no single official guidance document which fully covers the impacts assessed in this report and so it is helpful to consider the protection provided with respect to different development types.

Environment Agency

4.2 The Environment Agency has published criteria, which are also used by NRW, which allow impacts from developments requiring environmental permits to be rapidly screened out as insignificant (Environment Agency, 2021a; 2021b). These are applied to the impacts from developments in isolation (i.e. not in combination with other plans or projects). Exceeding these criteria does not mean that there is an LSE, it simply means that further consideration is required of the potential changes to air quality or deposition. No further assessment is required if the changes caused by the proposed development (termed the Process Contributions 'PC' by the Environment Agency) are all less than the relevant criteria in Table 3.

Table 3: Environment Agency Screening Criteria (% of CLe or CLo)

Site Type	Averaging Period [a]	Impacts of Ammonia Emissions from Intensive Pig and Poultry Farms	Impacts from Other Emissions
European Sites	LT	4% to 20% [b]	1%
	ST	[c]	10%
SSSIs	LT	20% to 50% [b]	1%
	ST	[c]	10%
NNRs, LNRs, LWS, and AW	LT or ST	100%	100%

[a] LT = Long Term (annual mean or 1-week mean), ST = Short-term (15-minute, 1-hour and 24-hour).

[b] The upper thresholds apply in where there are no other intensive farms which might affect the same receptors. Internally, the Environment Agency has begun requiring detailed modelling wherever the PC exceeds 4% of a CLe or CLo and the 20% criterion is not supported, but is still recommended in the Environment Agency's published guidance.

[c] There is no short-term CLes for ammonia and no short-term CLos.

4.3 The Environment Agency (2021a) also notes that there is no need for further consideration of changes to concentrations or deposition fluxes if:

- the annual mean concentration or flux is less than 70% of the CLe or CLo; and
- the short-term Process Contribution is less than 20% of the short-term CLe minus twice the long-term background concentration.

4.4 These criteria have been widely applied to the results from detailed dispersion modelling but are principally intended by the Environment Agency to guide a decision as to whether detailed modelling is required, with changes below the criteria not requiring such modelling.

National Highways

4.5 National Highways (then Highways England) issued guidance on the assessment of air quality impacts caused by Highways England road schemes as part of its Design Manual for Roads and Bridges (DMRB). The current version of this guidance is LA 105 (Highways England, 2019). This states that the air quality impacts of each individual project should be scoped out from any further assessment where the changes caused by the project in isolation (i.e. not in combination with other plans or projects) do not meet any of the following criteria within 200 m of a designated site:

- annual average daily traffic (AADT) >=1,000; or
- heavy duty vehicle (HDV) AADT >=200; or
- a change in speed band; or
- a change in carriageway alignment by >=5m.

4.6 As with the Environment Agency criteria, National Highways uses these values to define when a more detailed consideration of air quality impacts is required and not to define an LSE.

4.7 Where detailed air quality modelling has been carried out, guidance from National Highways is that there will be no significant effect wherever:

- the total nitrogen deposition is less than the relevant CLo; OR
- the change to nitrogen deposition caused by the proposed development (alone) is <1% of the CLo.

4.8 Changes with respect to a CLe are also considered to be not significant where one of the above criteria is met.

4.9 Where the potential for an LSE cannot be discounted using the above criteria, National Highways refers to Table 21 of Natural England Report 210 (Caporn et al., 2016), which is reproduced in Appendix A7.2 of this current report. This table estimates the increase to nitrogen deposition which would reduce species richness by one species. National Highways states that the effects will be not significant (i.e. no LSE) if the increases to nitrogen deposition caused by the project alone (i.e. not in combination with other projects or plans) are smaller than those in Appendix A7.2. This approach is described here in order to add context to the more robust approach which has been followed in the current assessment.

Natural England

4.10 Natural England's guidance on advising competent authorities on the assessment of road traffic emissions under the Habitats Regulations (Natural England, 2018) recommends the use of the DMRB criteria (see Paragraph 4.5) for changes to traffic caused by all types of plans or projects, and not just for highways schemes. In the same way, irrespective of their original derivation, Natural England (2018) adopts the 1% change criterion from the Environment Agency (Table 3) as a basis for screening out the need for more detailed assessment. It explains:

"the AADT thresholds and 1% of critical load/level are considered by Natural England's air quality specialists … to be suitably precautionary, as any emissions below this level are … considered to be imperceptible". It goes on: "There can therefore be a high degree of confidence in [the use of these criteria] to screen for risks of an effect".

4.11 Natural England (2018) further explains that the AADT criteria have "*been adopted here to simply help trigger when to look further where traffic projection data is the sole means of assessment* – [triggering the criteria] *does not immediately mean there will be an effect*".

4.12 A key difference between how these criteria are applied by Natural England (2018) when compared with both National Highways and the Environment Agency is that Natural England suggests that they should be applied first to the change caused by each individual project and then to the changes caused by relevant plans and projects in combination with one another.

4.13 Natural England provides guidance on which plans and projects should be considered within an in combination assessment for European sites. It explains that this "*is restricted to plans and projects which are 'live' at the same time as the assessment being undertaken. These can potentially include:*

- The incomplete or non-implemented parts of plans or projects that have already commenced;
- Plans or projects given consent or given effect but not yet started;
- Plans or projects currently subject to an application for consent or proposed to be given effect;
- Projects that are the subject of an outstanding appeal;
- Ongoing plans or projects that are the subject of regular review and renewal;
- Any draft plans being prepared by any public body;
- Any proposed plans or projects that are reasonably foreseeable and/or published for consultation prior to application."

4.14 Natural England also explains that an exhaustive search for live plans or projects which could potentially fall within the scope of an 'in-combination' assessment is not necessary:

"it is Natural England's view that staff in a competent authority can apply their professional judgment when considering this. It might be that a pragmatic approach to identifying the most pertinent ones may be required from the competent authority. It might be reasonable to initially limit a search to those plans and projects which are of most direct relevance to the subject plan or project under HRA (i.e. the likelihood of that plan or project's effects impacting upon the same site in-combination with the proposed plan or project). This may be those which are simply the closest to the site or within a certain distance from it, or the most influential in nature."

4.15 Natural England also stresses that, at the screening stage, the competent authority must "remember that the subject plan or project remains the focus of any in-combination assessment. Therefore, it is Natural England's view that care should be taken to avoid unnecessarily combining the insignificant effects of the subject plan or project with the effects of other plans or projects which can be considered significant in their own right… it is only the appreciable effects of those other plans and projects that are not themselves significant alone which are added into an in-combination assessment with the subject proposal."

IAQM

4.16 IAQM issued a guide to the assessment of air quality impacts on designated nature conservation sites in 2019, which was then amended in 2020 (Holman et al, 2020). This summarises the other guidance referred to above, but does not definitively recommend any one complete assessment approach. The limited areas where the IAQM guidance adds to, or unambiguously supports, that contained within other guidance documents are:

- on traffic screening criteria:
    - if the DMRB criteria (Paragraph 4.5) are used, they should be applied to changes in traffic caused by the development alone as well as in combination with other projects and plans;
- on the Environment Agency screening criteria:
    - the Environment Agency criteria (Paragraph 4.2) are suitable for screening the need for further assessment from all types of emissions sources where detailed air quality modelling has been carried out and not just those requiring environmental permits. The criteria should, though, "*be used in the context of an in-combination assessment*". The guidance also hints that the 100% criterion used by the Environment Agency for local site designations should not be used and that the 1% criterion should be used instead. The 100% criterion is not used in this assessment.
    - the 1% criterion should not be used rigidly, or with more precision than the modelling can justify (for example emphasising the difference between 0.9% and 1.1%);
    - that exceeding the 1% criterion is simply an indication that further investigation is needed and does not necessarily indicate an LSE;
- on defining in combination projects:
    - projects and plans to be considered include those that may have been approved but are, as yet, incomplete, the subject of an outstanding appeal, or ongoing review;
- on receptor siting:
    - it is recommended that the predictions are not made closer than 2 m from the edge of the road; and
- on designation types:
    - the IAQM document covers all site designation types and thus suggests that the same overall assessment method should be applied regardless of the designation.

CIEEM

4.17 The Chartered Institute of Ecology and Environmental Management (CIEEM) has published advice on the Ecological Assessment of Air Quality Impacts (CIEEM, 2021), which is intended for use by both ecologists and air quality specialists. This provides six steps to exploring potential effects:

1) identifying the baseline ecological features and air quality;

2) assessing confounding factors, background pollution trends, the relative importance of each sector, and the sensitivity of the receptor;

3) determining if the CLes or CLos are exceeded;

4) applying the CLes and CLos with expert judgement;

5) considering the project duration and seasonal effects; and

6) considering the relative importance of ambient concentrations versus deposition fluxes.

JNCC

4.18 The Joint Nature Conservation Committee (JNCC) has published Decision-Making Thresholds (DMTs) and Site-Relevant Thresholds (SRTs) for air pollution (Chapman and Kite, 2021), which were developed for JNCC by AQC (AQC, 2021). The thresholds define changes caused by individual projects (i.e. not in combination with other projects and plans) which can be discounted as not significant without additional work. Where the appropriate thresholds are exceeded, then further assessment will be needed. The SRTs are for emissions from industry and agriculture and take account of the overall development pressure in an area. The DMT for road traffic takes account of the scale of each development within the context of overall traffic growth but is ultimately expressed as a proportion of the baseline traffic flow. The thresholds are set out in Table 4, with additional guidance on defining development density given in Table 5.

4.19 The JNCC guidance makes clear that an air quality assessment is only necessary if the effects of a project have not already been assessed. This is particularly relevant with respect to development sites which are allocated in strategic development plans which have themselves been considered through a HRA. For example, there is no need to consider impacts on a European site from a development site which is allocated within a Local Plan if those impacts have already been considered when developing that Plan. The guidance also makes clear that the study area for the assessment of impacts from road traffic should not extend more than 10 km from a plan boundary, and that impacts alongside the Strategic Road Network[1] only require consideration for road infrastructure schemes.

4.20 Where the DMT for road traffic in Table 4 is exceeded, a "road-relevant" approach may be taken based on the distance between the affected road and the nearest boundary of a designated site. The JNCC guidance recommends that professional judgement is used, taking account of the predicted reduction with distance away from the road, and a view as to whether other plans and projects are likely to cause a combined exceedance of the 1% criterion described in paragraph 4.10 (Chapman and Kite, 2021).

4.21 There are specific exceptions where the JNCC criteria should not be used. These are summarised as:

- 'clean' or 'pristine' sites (i.e. those with very low existing levels of air pollution) where there is reason to doubt the improving background trend;
- sites with sensitive epiphytic or epilithic components that are, or form an important part of, a qualifying feature of the site and which are at or just below their CLo or CLe;
- sites with sensitive epiphytic or epilithic components that are, or form an important part of, a qualifying feature of the site and which are at or just below their CLo or CLe;
- sites with a highly localised and sensitive qualifying feature(s) that may coincide spatially with maxima of nitrogen deposition / ammonia concentrations from clusters of emission sources; and
- situations where it may be inappropriate to rely on DMTs because the assumptions which underpin them do not reflect the particular circumstances which apply (Chapman and Kite, 2021).

4.22 The development of these criteria included widespread consultation with ecology specialists and UK nature conservation agencies, as well as extensive legal review. The criteria are thus considered appropriate for use in this assessment.

[1] Our roads - Highways England, Official list of trunk roads (transport.gov.scot), Welsh Government strategic road network map | Traffic Wales, Link Corridors and Trunk Roads brochure | Department for Infrastructure (infrastructure-ni.gov.uk).

Table 4: Site-Relevant and Decision-Making Thresholds for Application to Individual Plans and Projects (AQC, 2021)

Development Density	Very Low	Low	Medium	High
Site-Relevant Thresholds for On-site Emissions				
Annual Mean NH_3 (lichens/bryophytes) ($\mu g/m^3$)	0.0075	0.0034	0.0020	0.00079
Annual Mean NH_3 (higher plants) ($\mu g/m^3$)	0.022	0.010	0.0060	0.0024
Annual Mean NOx ($\mu g/m^3$)	0.087	0.046	0.030	0.014
Annual Mean N dep (woodland (kg-N/ha/yr)	0.13	0.057	0.034	0.013
Annual Mean N dep (grassland) (kg-N/ha/yr)	0.088	0.040	0.024	0.0093
Decision-Making Threshold for Road Traffic				
Increase in Traffic Flow	0.15% of AADT in the year that the assessment is carried out			

Table 5: Guidance on Defining Development Density for On-site Emissions (AQC, 2021)

Development Density	Very Low	Low	Medium	High
Description [a]	Remote area which sees very little development	Area which sees small amounts of development	Typical agriculture / industrial area	Area experiencing intensive growth (e.g. Powys or Immingham docks)
Example Number of additional new projects below the thresholds within 5 km of proposed development over 13 yrs [a]	1	5	10	30

[a] These might be either industrial or agricultural projects, or both.

5 Assessment Approach

Study Area

5.1 Consideration has been given to potential effects on all European sites, SSSIs, National Nature Reserves, Local Nature Reserves, and ancient woodlands within 200 m of roads on which traffic flows have been predicted by SCP Transport Planning to increase as a result of the scheme. This is the distance used in guidance from National Highways (Highways England, 2019) and Natural England (2018).

5.2 The locations of designated nature conservation sites have been identified from information published by Defra, JNCC and the Welsh Government. In principle this identifies all European sites, SSSIs, National Nature Reserves, Local Nature Reserves, and ancient woodlands. There may be other local scale designations which are not included in these datasets, but it is not within the scope of this assessment to carry out an exhaustive search of conservation sites which are not collated by the statutory nature conservation bodies.

5.3 Relevant habitat features within the designated sites, and where relevant their potential geographic extent, have been identified with reference to APIS and NRW maps and in consultation with the project ecology consultants (Ramm Sanderson).

5.4 The only site that has been identified as being potentially affected by the proposed development and having sensitive features is that part of the River Usk SAC shown in Figure 1.2.

Receptors

5.5 Impacts have been predicted at the receptor selected to represent the location within the relevant salt marsh area which is closest to the A48, along with a transect of receptors running perpendicular to the roadside, extending 200 m from the road. Following guidance from the IAQM (Paragraph 4.16), impacts have not been predicted within 2 m of roads. These roadside receptors are shown in Figure 5.1 and described in Table 6.

5.6 All receptors within the transect have been modelled at a height of 1.5 m to ensure consistency with the national background deposition modelling carried out on behalf of Defra and used within this assessment.

Table 6: Description of Roadside Receptor Transect for the Salt Marsh Area in the River Usk SAC

Receptor	Distance from Roadside (m)	X coordinate	Y coordinate
Receptor 1	2	332851.4	186916.8
Receptor 2	3	332851.6	186917.8
Receptor 3	5	332851.9	186919.7
Receptor 4	9	332852.2	186923.7
Receptor 5	17	332853.1	186931.5
Receptor 6	33	332855.1	186947.4
Receptor 7	65	332858.4	186978.8
Receptor 8	129	332828.8	187041.8

Receptor	Distance from Roadside (m)	X coordinate	Y coordinate
Receptor 9	200	332792.6	187106.1

Figure 5.1: Transect Locations for Designated Conservation Site

Background Concentrations and Fluxes

5.7 Background concentrations of NOx and ammonia, and nitrogen and acid nitrogen deposition fluxes, have been taken from the Air Pollution Information System (APIS) website (APIS, 2024). The NOx concentrations represent 1 km x 1 km averages, while the ammonia concentrations and deposition fluxes represent 5 km x 5 km averages. APIS currently presents 3-year mean values centred on the calendar year of 2021. These have been adjusted to represent 3-year averages centred on 2022 and 2028 using the rate of change, at each individual receptor, predicted using the Business-as-Usual assumptions of JNCC's Nitrogen Futures project[2] and specifically, the 1 km x 1 km gridded data

[2] https://jncc.gov.uk/our-work/nitrogen-futures/. A linear rate of change has been assumed between 2017 and the 2030 Business as Usual scenario, with the APIS 2021 data scaled based on the location-specific predicted changes. Acid nitrogen deposition has been scaled proportionally to nutrient nitrogen.

published by JNCC. Background concentrations of NO_2 have been defined using Defra's 2018-based background maps (Defra, 2024a). These cover the whole of the UK on 1x1 km grid.

Assessment Scenarios

5.8 NOx and ammonia concentrations, and nitrogen and acid deposition fluxes, have been predicted for the following scenarios:

A) 2022 base year;

B) 2028 without any increase in traffic from 2022 (including future-year emissions factors and future-year background concentrations and fluxes but base-year traffic within the dispersion model). This is a counterfactual scenario used to determine the in-combination impacts;

C) 2028 without the development but with the forecast background increase in traffic from 2022 to 2028 (also including future-year emissions factors and background concentrations and fluxes); and

D) 2028 with both the proposed development and background traffic growth (also including future-year emissions factors and background concentrations and fluxes).

5.9 The three 2028 scenarios have been compared to derive the impacts of the proposed development alone and in-combination with other projects and plans:

- the difference between scenarios C and D represents the change caused by the proposed development which, for consistency with other regimes, is termed the Process Contribution ('PC'); and
- the difference between scenarios B and D represents the In-Combination Change ('ICC').

5.10 It should be noted this is a highly conservative approach for determining in-combination effects which is used when traffic data for specific in-combination schemes is unavailable; it is the effect of all traffic growth from the baseline year in-combination with the proposed development.

Modelling Methodology

5.11 Concentrations have been predicted using the ADMS-Roads dispersion model, with emissions of NOx derived using Defra's Emission Factor Toolkit (EFT) (v12.0) (Defra, 2023), and emissions of ammonia derived using AQC's Calculator for Road Emissions of Ammonia (CREAM) (v1A) model. Traffic flows have been derived from data provided by Department for Transport (DfT) and baseline traffic data presented within an air quality assessment report in support of the planning application for the nearby Former Orb Site Steelworks Phase 1 development in Newport (Kairus Ltd, 2024). Details of the model inputs are provided in Appendix A7.3. Deposition fluxes have been calculated from the predicted concentrations of nitrogen dioxide and ammonia. Details on the method for calculating the deposition are also provided in Appendix A7.3.

Uncertainty

5.12 There are many components that contribute to the uncertainty of modelling predictions. The road traffic emissions dispersion model used in this assessment is dependent upon the traffic data that have been input, which will have inherent uncertainties associated with them. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms.

5.13 Predicting pollutant concentrations in a future year will always be subject to greater uncertainty, and it is necessary to rely on a series of projections provided by DfT and Defra as to what will happen to

traffic volumes, background pollutant concentrations and vehicle emissions. Historic versions of Defra's EFT tended to over-state emissions reductions into the future. However, analyses of the more recent versions of Defra's EFT carried out by AQC (2020b) (2020c) suggest that, on balance, these versions are unlikely to over-state the rate at which NOx emissions decline in the future at an 'average' site in the UK. In practice, the balance of evidence suggests that NOx concentrations are most likely to decline more quickly in the future, on average, than predicted by the current EFT, especially against a base year of 2016 or later. Using EFT v12.0 for future-year forecasts in this report thus provides a robust assessment.

5.14 Historically, less attention has been given to calculating emissions of ammonia from road traffic than to calculating emissions of NOx. Future forecasts of traffic-related ammonia are thus quite uncertain. However, the CREAM model takes a deliberately conservative approach regarding these future uncertainties and can thus be considered robust.

Assumptions

5.15 It is necessary to make a number of assumptions when carrying out an air quality assessment; in order to account for some of the uncertainty in the approach, as described above, assumptions made have generally sought to reflect a realistic worst-case scenario. Key assumptions made in carrying out this assessment include:

- the assumption that the phase 3[3] of the proposed development is complete and fully operational in 2028;
- that the Cardiff meteorological monitoring station appropriately represents conditions in the study area (this is discussed further in Appendix A7.3); and
- that the A48 passes the SAC at a variety of elevations where the bridge crosses over the SAC (this is discussed further in Appendix A7.3).

[3] Phase 3 of the proposed development has the greatest HDV movements once operational. The HDV movements associated with the earlier phases (1 and 2) are below the JNCC DMTs and therefore no detailed assessment of the earlier phases has been undertaken.

6 Background Information and Context

Habitat Features

6.1 The River Usk SAC extends over 1015 hectares. Information available on APIS shows that the site as a whole supports a large number of notified features. However, Ramm Sanderson have advised that many of these features are highly unlikely to be present, either now or in the future, within 200 m of any of the roads included in this assessment. The current assessment has thus considered potential impacts with respect to the Atlantic upper-mid & mid-low salt marshes, as NRW maps show salt marsh as present within 200 m of the A48, in the area shown in Figure 1.2.

Background Concentrations and Fluxes

6.2 Estimated background concentrations of NOx and ammonia are set out in Table 7. A range of values is presented covering the receptors of concern to this assessment. The background concentrations of NOx are predicted to be well below the CLe in both 2022 and 2028. Predicted background concentrations of NH_3 are below the CLe of 3 µg/m^3 in both years.

Table 7: Estimated Annual Mean Background Pollutant Concentrations in 2022 and 2028 (µg/m^3)

Year	NOx	NH_3
2022	17.39	1.44
2028	13.21 – 13.22	1.49 – 1.51
CLe	30	3

6.3 Background nitrogen deposition fluxes are presented in Table 8. Predicted background nutrient nitrogen deposition rates exceeded the lower CLo in both years. The predicted background acid nitrogen deposition rates were below the Clo in both years.

Table 8: Estimated Annual Mean Background Deposition Fluxes in 2022 and 2028 (µg/m^3)

Year	Nutrient Nitrogen Deposition (kgN/ha/yr)	Acid Nitrogen Deposition (keq/ha/yr)	Nutrient Nitrogen CLo (kgN/ha/yr)	Acid Nitrogen CLo (keq/ha/yr)
2022	13.31	0.95	10	4.0
2028	12.86	0.92	10	4.0

7 Impact Assessment

Changes to Traffic Flows

7.1 There are no roads within the study area on which the proposed development is predicted to increase traffic flows by more than the criteria defined by National Highways (Paragraph 4.5). There is, however, one road (the A48) on which the increase in traffic caused by the operational phase 3 of the proposed development exceeds the DMT for road traffic defined by JNCC (Table 4) and which passes within 200 m of an area of salt marsh within the River Usk SAC.

7.2 It has thus been necessary to consider the air quality impacts of the proposed development on this site.

Air Quality Conditions at Worst-case Locations

7.3 Air quality conditions at the worst-case location within the River Usk SAC are set out in Table 9. Predictions are presented for the modelled receptor which is 2 m away from the road, as this location had the highest predicted concentrations and fluxes, maximum PC and maximum ICC.

7.4 Results are provided for all four assessment scenarios described in Paragraph 5.8. The CLo for nitrogen deposition is exceeded at the worst-case location in all scenarios. The CLes for annual mean and 24-hour mean NOx concentrations, annual mean ammonia concentrations and acid deposition are achieved in all scenarios. Annual mean NOx concentrations are less than 70% of the Cle in all future scenarios but not in the 2022 Existing Baseline scenario.

Table 9: Air Quality Conditions at Worst-case Locations in the River Usk SAC

Year	2022	2028			Cle / CLo
Pollutant/Averaging Period	Existing Baseline	No Growth [a]	Without Development [b]	With Development [c]	
Annual Mean NH_3 (µg/m^3)	2.10	2.22	2.26	2.26	3
Annual Mean NOx (µg/m^3)	26.58	17.46	17.67	17.70	30
24-Hr Mean NOx (µg/m^3)	66.75	41.58	42.33	42.43	75/200
Nitrogen Deposition (kg-N/ha/yr)	17.46	16.93	17.14	17.17	10
Acid Deposition (keq/ha/yr)	1.25	1.21	1.22	1.23	4

[a] Assuming future-year emissions factors and background concentrations/fluxes, but excluding any increase in traffic on local roads between 2022 and 2028. The predicted changes to background implicitly include increases to traffic on a UK level.

[b] Assuming future-year emissions factors and background concentrations/fluxes and forecast increase to traffic on local roads (excluding the proposed development) between 2022 and 2028.

[c] Assuming future-year emissions factors and background concentrations/fluxes, forecast increases to traffic and the proposed development.

Changes to Air Quality at Worst-case Locations

7.5 Table 10 summarises the changes to concentrations and deposition fluxes at the worst-case identified location. Table 11 expresses these changes in relation to the CLes (Table 1) and CLos (Table 2). It also shows how much of the improvements to NOx concentrations and deposition fluxes which are predicted without either the proposed development or the IC projects will be removed by these developments.

7.6 All of the PC's (when rounded) are 0% (i.e. less than 0.5% when unrounded) of the CLos and CLes. Thus, according to the guidance summarised in Section 4, the effects of the proposed development, when viewed in isolation, will be not significant and not give rise to an LSE. All of the ICC's are no greater than 1% of the CLos and CLes, except for nitrogen deposition where the ICC is predicted to be 2% of the CLo at the worst-case receptor. Based on the guidance in Section 4, the effect in-combination with other projects (based on conservative assumptions on traffic growth) on annual mean ammonia, annual and 24-hour NOx and acid deposition, will not be significant and not give rise to an LSE. However, as the ICC for nitrogen deposition is greater than 1% of the CLo at some transect locations, the guidance from Natural England and IAQM (see Section 4) does not, therefore, allow the effects in-combination with other relevant projects to be immediately discounted for nitrogen deposition.

Table 10: Summary of Worst-case Changes to Air Quality Conditions in the River Usk SAC

Pollutant/Averaging Period	Change from Existing Baseline			ICC	PC
	Without IC[a]	With IC[a] Without Development	With IC[a] and With Development		
Annual Mean NH_3 (µg/m^3)	0.12	0.15	0.16	0.04	0.01
Annual Mean NOx (µg/m^3)	-9.13	-8.91	-8.88	0.25	0.03
24-Hr Mean NOx (µg/m^3)	-25.17	-24.42	-24.32	0.86	0.10
Nitrogen Deposition (kg-N/ha/yr)	-0.53	-0.32	-0.29	0.24	0.03
Acid Deposition (keq/ha/yr)	-0.04	-0.02	-0.02	0.02	0.00

[a] i.e. with and without forecast increases to traffic which are unrelated to the proposed development.

Table 11: Summary of Worst-case Changes to Air Quality Conditions in the River Usk SAC as Percentage of Relevant Criteria [a]

	As % of Cle/CLo		As % of Autonomous Changes [b]	
Pollutant/Averaging Period	PC	ICC	PC	ICC
Annual Mean NH_3	0%	1%	-5%	-36%
Annual Mean NOx	0%	1%	0%	3%
24-Hr Mean NOx [c]	0% (0%)	1% (0%)	0%	3%
Nitrogen Deposition	0%	2%	5%	45%

	As % of CIe/CLo		As % of Autonomous Changes [b]	
Acid Deposition	0%	0%	5%	45%

[a] Following guidance from the IAQM (Paragraph 4.16) percentage values have been rounded to the nearest whole number.

[b] i.e. as a percentage of the changes which are forecast from the existing baseline without any IC projects.

[c] Values in parentheses are as a percentage of the higher CLe of 200 μg/m^3.

Spatial Distribution of Air Quality Impacts

7.7 The nitrogen deposition ICC exceeds 1% of the CLo at receptors of distances up to 33 m from the roadside only and does not exceed this criterion at distances of 65 m or more. Therefore, it is judged that area over which the nitrogen deposition ICC exceeds 1% of the CLo covers approximately 0.01% of the total SAC area. The ICC does not exceed 1% of the CLe or Clo at any modelled receptors for any other pollutants.

Assessment

7.8 For all pollutants modelled, the PC (when rounded) was 0% of the respective CLe or CLo. Furthermore, the ICC (when rounded) was no more than 1% of the respective CLe or CLo for any pollutant except for nitrogen deposition where the worst-case ICC was 2% of the CLo. However, as stated in Paragraph 7.7, this ICC exceedance of 1% of the CLo affects a very small area (approximately 0.01%) of the overall SAC.

7.9 It should also be recognised that the deposition velocities which have been used for ammonia may be particularly conservative. There is strong evidence that where ammonia concentrations are high, the deposition of ammonia can be significantly inhibited (Cape et al, 2008). The deposition velocity for ammonia used in this assessment was developed by the AQTAG to be precautionary in most settings. Thus, close to emissions sources it is likely to have caused the deposition of ammonia to have been over-predicted. Nevertheless, the worst-case PC for ammonia and nitrogen and deposition were below 1% of the CLe or CLo.

7.10 As shown in Table 11, even with the conservative assumptions which have been included in the assessment, the maximum PCs for NOx, nitrogen deposition and acid deposition, represent only a small fraction (0 to 5%) of the autonomous changes which have been predicted between the baseline year and the assessment year.

7.11 The PCs and ICCs for NOx, nitrogen deposition and acid deposition, when expressed as fractions of the autonomous changes, are smaller than those which NE has previously described as causing only a "*marginal*" retardation of the forecast improvements to air quality, meaning that concentrations and deposition rates will "*continue to decline*" (see Paragraphs A1.12 to A1.14 Appendix A7.1). Paragraph A1.13 explains that the absence of a net reduction for ammonia does not prevent the same conclusion being reached. This is important since, to conclude a potential LSE in this situation, would go against the clear advice given, and defended, by NE regarding the interpretation of PCs and ICCs in relation to autonomous changes.

7.12 Figure 7.1 to Figure 7.4 show the forecast changes to pollutants under different future scenarios (i.e. scenarios B, C and D in paragraph 5.8). They only consider the location where the PC is greatest, as

this provides a worst case assessment. Nevertheless, the forecast changes in pollutant levels are almost indistinguishable for all three future scenarios, with or without the proposed development. Over the remainder of the site, impacts will be even smaller.

7.13 On the basis of this assessment, it is concluded that the effects of the proposed development can be screened out as not significant. No further assessment is thus needed to discount the potential for an LSE in relation to the proposed development.

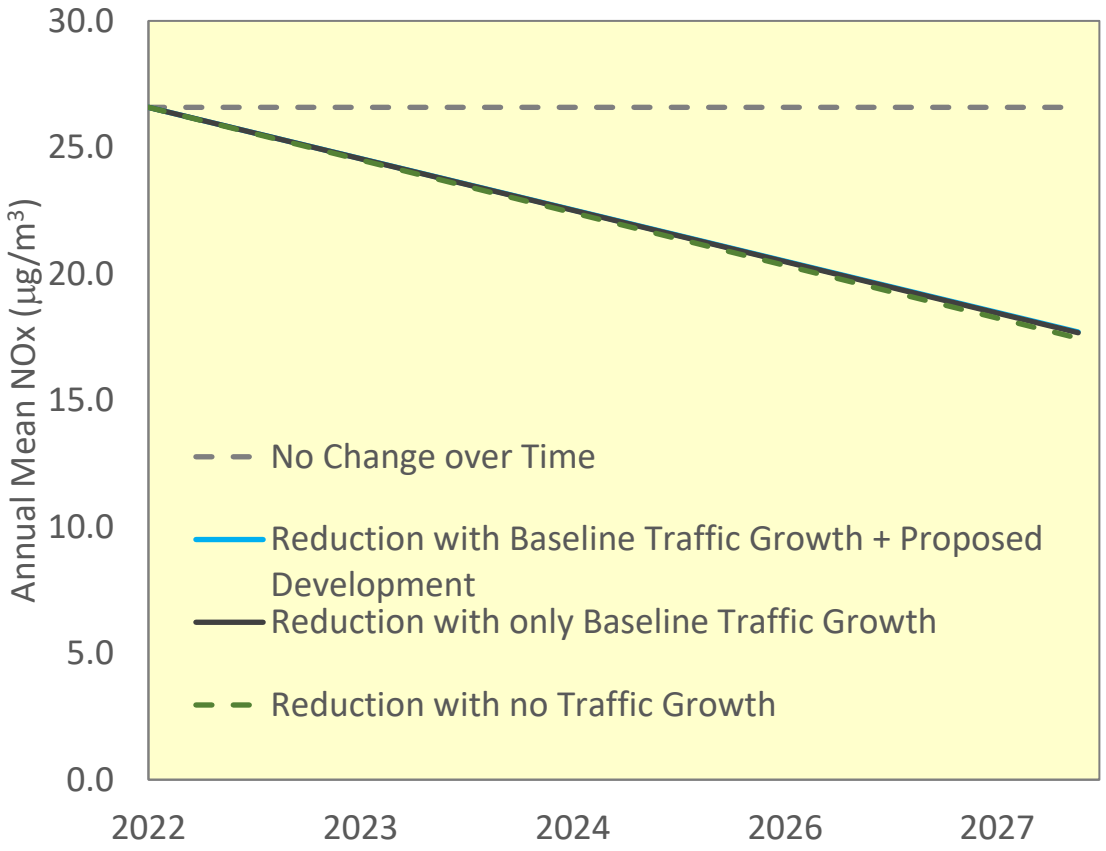

Figure 7.1: Visualisation of Forecast Changes to Annual Mean NOx at the Location of the Maximum PC under Different Future Scenarios[4]

[4] For the sake of simplicity, trajectories are shown as being linear.

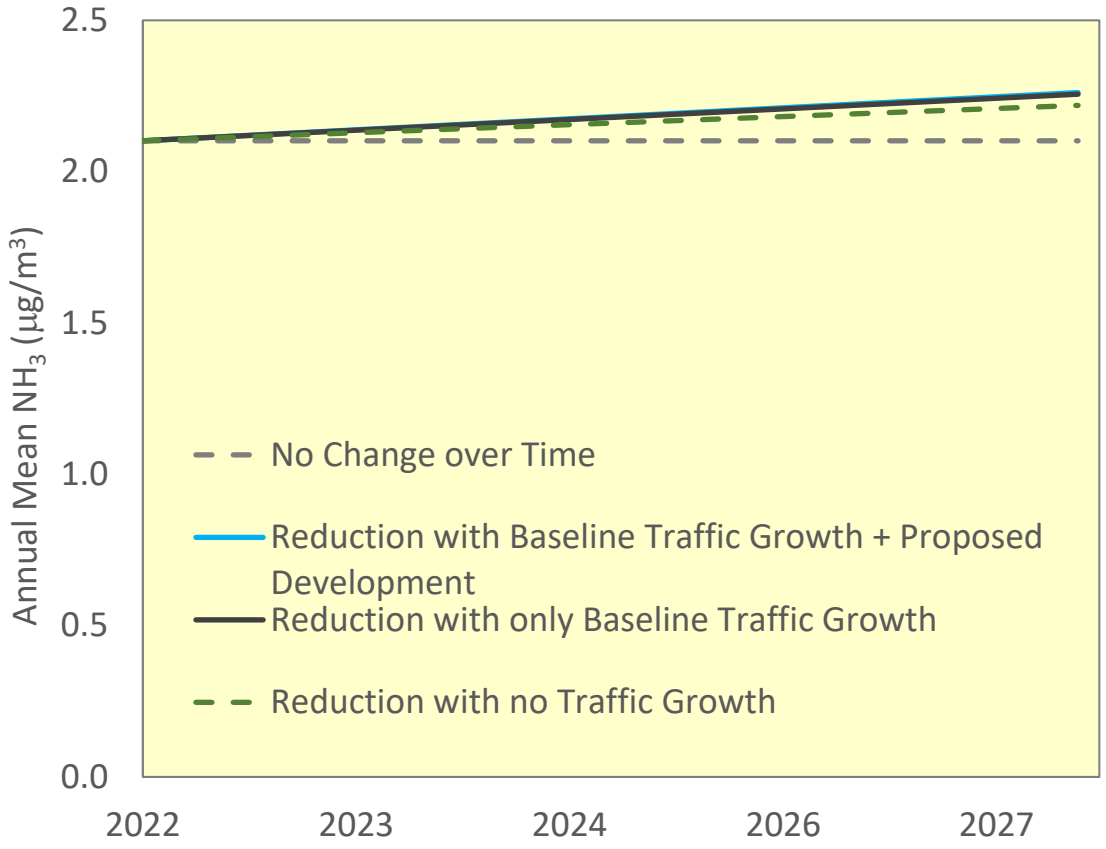

Figure 7.2: Visualisation of Forecast Changes to Annual Mean Ammonia at the Location of the Maximum PC under Different Future Scenarios[4]

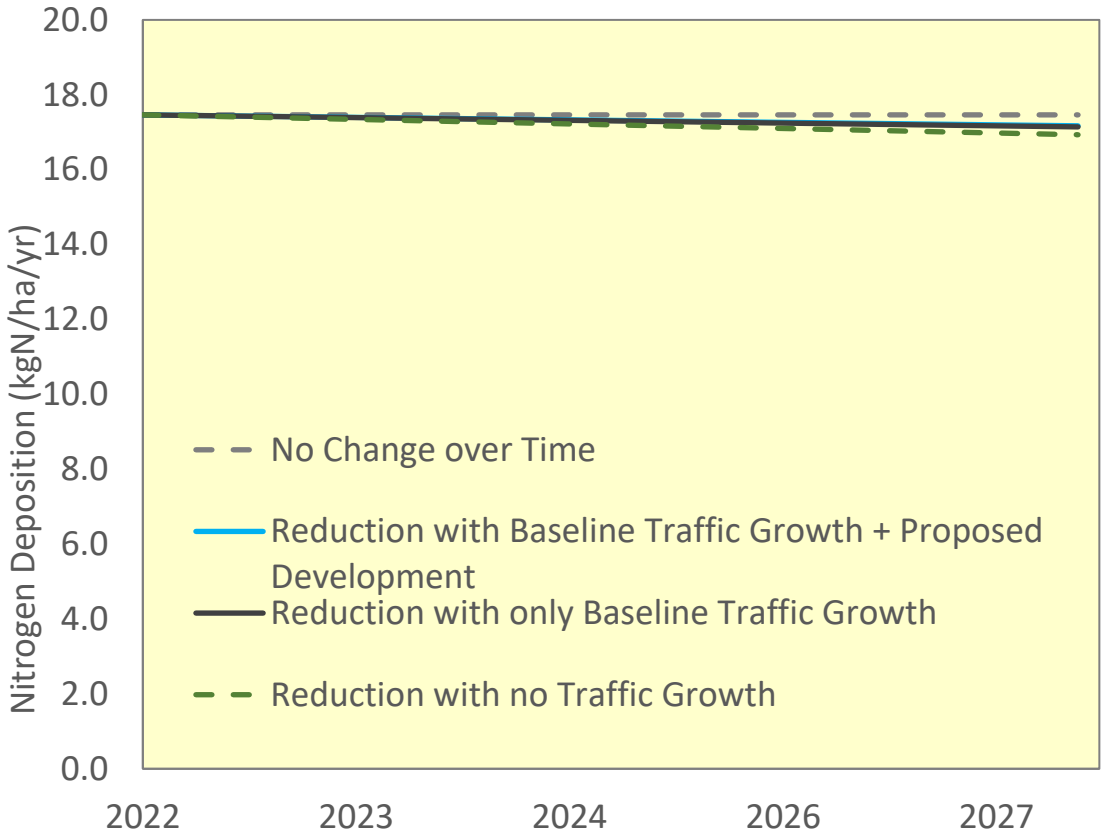

Figure 7.3: Visualisation of Forecast Changes to Nitrogen Deposition at the Location of the Maximum PC under Different Future Scenarios[4]

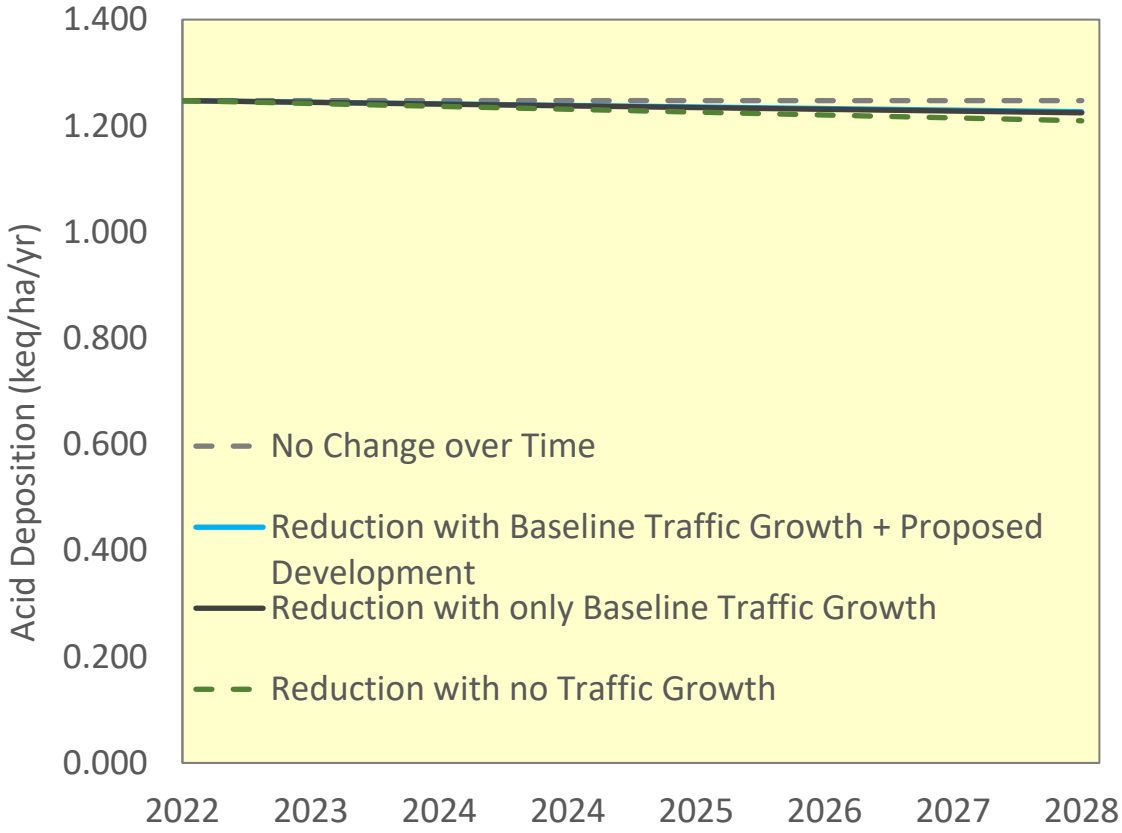

Figure 7.4: Visualisation of Forecast Changes to Acid Deposition at the Location of the Maximum PC under Different Future Scenarios[4]

8 Conclusions

8.1 A screening assessment has been provided for air quality effects on biodiversity associated with operational phase traffic of the proposed development. The emissions which have been considered are emissions from road traffic generated by the phase 3 operation of the proposed development. The increase to traffic associated with the proposed development will be greater than the Decision-Making Threshold defined by JNCC, meaning that a quantitative assessment is required.

8.2 The proposed development will increase concentrations of NOx and ammonia, and nitrogen deposition fluxes within the salt marsh area of the River Usk SAC within 200 m of the A48. However, there is only a very small part of the site where the increase for nitrogen deposition in combination with other projects and plans, cannot readily be discounted as insignificant through application of commonly accepted screening criteria. For all other pollutants, the increases can be discounted as insignificant at every modelled location. Additionally, the slight exceedance of the screening criteria for nitrogen deposition is only seen when assessing effects in combination with future traffic growth, not when assessing the effects of the proposed development in isolation. Furthermore, the percentage of the River Usk SAC where the exceedance of the screening criterion is seen is very low (approximately 0.01% of the SAC's area).

8.3 The increase to concentrations and deposition fluxes at the worst-case locations within the River Usk SAC, both in isolation and in combination with other projects, have been compared with the concurrent changes forecast without these projects. This follows the assessment process which NE has taken with respect to air quality impacts elsewhere. It has been shown that, when viewed in this context, the impacts are smaller than those which NE describes as causing only a marginal retardation of the improvements over time. It is acknowledged that this is an area of scientific uncertainty and NRW may take different views from NE.

8.4 On the basis of this assessment, it is concluded that the effects of the proposed development on biodiversity can be screened out as not significant without needing any additional assessment.

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10 Glossary

AA	Appropriate Assessment
AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System model for Roads
APIS	Air Pollution Information System
AQAL	Air Quality Assessment Level
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
CLe	Critical Level - "concentrations of pollutants in the atmosphere above which direct adverse effects on receptors, such as human beings, plants, ecosystems or materials, may occur according to present knowledge" (APIS, 2024)
CLo	Critical Load – "a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge" (APIS, 2024)
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EFT	Emission Factor Toolkit
EPUK	Environmental Protection UK
EU	European Union
EV	Electric Vehicle
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HMSO	His Majesty's Stationery Office
IAQM	Institute of Air Quality Management
kph	Kilometres Per hour
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)
LNR	Local Nature Reserve
LSE	Likely Significant Effect. An effect is 'likely' if it cannot be excluded on the basis of objective information. An effect is 'significant' if it undermines the conservation objectives.

$\mu g/m^3$	Microgrammes per cubic metre
NE	Natural England
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)
NRW	Natural Resources Wales
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
OLEV	Office for Low Emission Vehicles
PC	Process Contribution
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
PPW	Planning Policy Wales
RDE	Real Driving Emissions
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TAN	Technical Advice Note
TEMPro	Trip End Model Presentation Program
WHO	World Health Organisation

11 Appendices

A7.1 Relevant Case Law

A1.1 Interpretation of the Habitats Regulations with respect to air quality impacts and effects has been shaped by judgements and opinions of European and UK courts. Published findings of the Planning Inspectorate for England and Wales, and the advice given to this Inspectorate by Natural England, has also proven seminal in defining how air quality impacts on European sites should be assessed. A brief summary of some key cases, in chronological order, is given below.

2004 - Waddenzee[5]

A1.2 This case in the Court of Justice of the European Union (CJEU) explained the extent to which the precautionary principal must be followed in HRA. In particular, the judgement (para 61) notes: "*the competent national authorities …. are to authorise such an activity only if they have made certain that it will not adversely affect the integrity of that site. That is the case where no reasonable scientific doubt remains as to the absence of such effects*".

2009 - Boggis[6]

A1.3 This judgement explained that a breach of Article 6.3 does not occur solely because of a hypothetical risk of harm to a designated site. There must be credible evidence that the risk is real for this to require consideration (para 37).

2011 Sweetman[7]

A1.4 This judgement from the CJEU also emphasised the need for the precautionary principal. In particularly, it highlighted that the word "Likely" in LSE is unique to the English language interpretation of the Habitats Directive and should not be seen as synonymous with 'probable'. The judgement explained that an AA "*cannot have lacunae and must contain complete, precise and definitive findings and conclusions capable of removing all reasonable scientific doubt as to the effects of the works proposed on the protected site concerned*".

2013 – Lough Corrib[8]

A1.5 This case in the CJEU explained that the entirety of each European site is protected by the Habitats Directive: if a "plan or project will lead to the lasting and irreparable loss of the whole or part of a priority natural habitat type whose conservation was the objective that justified the designation of the site concerned …, the view should be taken that such a plan or project will adversely affect the integrity of that site." (para 46).

2017 - Wealden 1[9]

A1.6 This case in the UK High Court concerned the approach to in-combination assessments pursuant to the Habitats Regulations. The principal issue was whether it was appropriate to apply a screening criterion published by Highways England (in which changes of less than 1,000 vehicles per day could be discounted as not significant) to consider the impacts of individual plans. The overall conclusion in this respect was that the criterion should have been applied to the aggregated change caused by two plans and not to each plan in isolation. This has changed the approach taken at the screening

[5] Case C-127/02. https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:62002CJ0127:EN:PDF
[6] [2009] EWCA Civ 1061. Boggis & Anor v Natural England & Anor [2009] EWCA Civ 1061 (20 October 2009) (bailii.org)
[7] Case C-258/11 (Sweetman) Judgement para 44, 46 and 47
[8] Case C-258/11. CURIA - Documents (europa.eu)
[9] Judgment in Wealden District Council v Secretary of State for Communities and Local Government, Lewes District Council and South Downs National Park Authority) [2017]

stage of HRA, which now routinely considers the effects of plans and projects in combination as well as on their own.

2018 People over Wind[10]

A1.7 The judgement of the CJEU was that it was more appropriate to consider the effects of mitigation at the AA stage rather than at the screening stage: "*it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site*". This is particularly challenging to reconcile with the concepts of 'better by design' and 'air quality positive' which expect consideration of air quality improvement to run throughout the design of a project. Since the People over Wind judgement, most assessments consider that on-site measures to reduce emissions which are not required solely to avoid an LSE can form part of the assessment considered at the screening stage.

2018 Dutch Nitrogen Cases[11]

A1.8 These two cases highlighted several interesting points. The most relevant in terms of air quality assessment in the UK are:

1) that an AA may not take into account the existence of 'autonomous' measures[12] (i.e. measures not part of that programme), if the expected benefits of those measures are not certain;

2) that screening thresholds may only be used to discount an LSE from a project if there is no reasonable scientific doubt that that project will not affect the integrity of a designated site in combination with other plans and projects; and

3) that recurring activities such as grazing and fertilizer use may be classified as a 'project' in the context of the Habitats Directive.

2019 - Examination of the Submission Wealden Local Plan

A1.9 This does not relate to a court case, but the judgements expressed by NE and the planning inspectorate have had significant implications for the way in which air quality impacts on nature conservation sites are assessed in the UK. In particular, they form the basis of the approach which was taken to derive the DMTs and SRTs (see Paragraph 4.18). Furthermore, the political implications for Wealden District Council (WDC) of not following NE's advice on this matter have provided a clear signal to other local planning authorities regarding the treatment of autonomous measures in planning decisions.

A1.10 In the evidence supporting its 2018 Submission Local Plan, Wealden District Council showed the impact of its Submission Plan on air quality conditions within the Ashdown Forest SAC. It quantified the PC and ICC, and also showed the net effect of forecast changes to national and international emissions (i.e. autonomous measures). These emissions were forecast using three alternative approaches, each of which assumed a different level of efficacy of the autonomous measures.

[10] C-323/17 Judgement of the Court 12 April 2018, Request for a preliminary ruling under Article 247 TFEU from the High Court (Ireland), made by decision on 10 May 2017, received at the Court on 30 May 2017, in the proceedings of People Over Wind and Peter Sweetman v Coillte Teoranta, curia.europa.eu/juris/document/document.jsf?text=&docid=200970&pageIndex=0&doclang=en&mode=req&dir=&occ=first&part=1&cid=619449.
[11] Coöperatie Mobilisation for the Environment UA and Vereniging Leefmilieu v College van gedeputeerde staten van Limburg and College van gedeputeerde staten van Gelderland. Requests for a preliminary ruling from the Raad van State Joined Cases C-293/17 and C-294/17
[12] i.e. measures which are not being delivered as part of the plan, project, or programme being assessed.

A1.11 NE advised WDC that it should base its plan-making solely on the scenario that used AQC's CURED model[13], but instead the Council took account of all three emissions scenarios, including one in which autonomous measures were assumed to have no effect[14] .

A1.12 Under NE's preferred scenario[13], improvements caused by autonomous measures were predicted to be greater than the adverse effects of the Submission Local Plan, both alone and in-combination with other predicted traffic growth (i.e. the effect of autonomous measures was greater than both the PC and ICC). Detailed habitats surveys had identified the distribution of the protected feature, and at the worst relevant location, the PC was predicted to remove 53% of the autonomous improvements, while the ICC was predicted to remove 74% of the autonomous improvements[15]. These predictions were used by NE to inform its supplementary conservation objectives for Ashdown Forest (Natural England, 2019). Making specific reference to the modelling published by WDC, NE stated:

"Assessment of improvements in vehicular technology and in particular Euro6/VI standards that all vehicles are currently being manufactured to, will outweigh impacts from new development. The improvements will be marginally retarded by additional development but future nitrogen deposition and concentration will continue to decline with the existing trend." (Natural England, 2019).

A1.13 This statement relates to the entire SAC and thus takes account of the large area where the ICC was predicted to remove less than 74% of the autonomous improvements, as well as these worst-case impacts. NE also explained the importance of this net downward trend in its representations to the planning inspector[16,17]. The predicted improving trend related only to NOx and nitrogen deposition. The modelling published by WDC, to which NE referred, did not predict any reductions to ammonia concentrations, only adverse impacts. NE's advice took a holistic view of ambient concentrations in general in its advice relating to air quality.

A1.14 It is important to note that NE's position regarding the importance of autonomous emissions reductions at Ashdown Forest did not refer to specific habitat features, their sensitivity, or any other ecological context. The statement which is quoted in Paragraph A1.12, relates solely to air quality forecasts. A key disagreement between WDC and NE was whether the autonomous measures included in the air quality forecasts were sufficiently certain for decision making in the context of the Habitats Regulations[18]. The Submission Plan ultimately had to be withdrawn, partly because of WDC's failure to take account of NE's advice on the significance of the PC and ICC when viewed in the context of the benefits provided by autonomous measures[19].

[13] This was termed 'Scenario B'. AQC's CURED model has since been withdrawn but the modelling presented in this report is consistent with the level of precaution which was inherent in this model scenario.
[14] This was termed 'Scenario A'.
[15] As documented in the executive summary of the air quality modelling report cited by Natural England (2019) which shows the maximum deposition to heath predicted using the most detailed modelling would fall from 22.7 kgN/ha/yr in 2015 to: 19.3 kgN/ha/yr in 2028 without any 'in-combination' traffic; 20.8 kgN/ha/yr in 2028 without the Submission Plan, and 21.8 kgN/ha/yr with the Plan..
[16] e.g. Paragraphs 19 to 25, and Paragraphs 37 to 46 of Annex 1 to Natural England Comments on Proposed Submission Document 05/08/18 – Natural England ref 255168 (available on request).
[17] It is important to note that the examination in public followed shortly after the judgement from the Dutch Nitrogen Cases, which were discussed at length and thus fully accounted for in advice from both Natural England and the planning inspector.
[18] In particular, WDC noted that measurements showed that traffic-related nitrogen deposition had, on average, been increasing for many years despite the same forecasts showing concurrent reductions.
[19] Wealden District Council concluded that the PC and ICC were both potentially significant without mitigation, while for the reasons given in Paragraph 1)a)i)(1)(a)(i)A1.12, Natural England determined that mitigation was not required.

A7.2 Data from (Caporn et al., 2016) Cited by National Highways

Table A2-1: Values from Table 21 of Caporn et al (2016) Relied on in National Highways' Assessment Method

Habitat	Nitrogen Deposition KgN/ha/yr						
	CLo	Background deposition					
		5	10	15	20	25	30
		Increase required to reduce measured species richness by 1					
Upland heath [a]	10-20	0.4	0.8	1.3	1.7	2.0	2.4
Upland heath [a]	10-20	1.7	2.0	2.5	3.3	5.0	20.0
Lowland heath	10-20	0.4	0.8	1.3	1.7	2.0	2.4
Bog	5-10	-	-	-	3.3	-	-
Sand dunes [a]	8-15	0.1	0.5	1.1	2.0	-	-
Sand dunes [a]	8-15	0.3	0.6	0.9	1.3	-	-
Sand dunes [a]	8-15	0.3	0.6	0.9	1.3	-	-
Acid grasslands	10-15	1.7	1.7	2.0	2.0	2.5	2.5

[a] Based on two separate studies using different quadrat sizes.

A7.3 Modelling Methodology

Model Inputs

A1.15 Predictions have been carried out using the ADMS-Roads dispersion model (v5). The model requires the user to provide various input data, including emissions from each section of road and the road characteristics (including road width and height where applicable). Vehicle emissions have been calculated based on vehicle flow, composition and speed data using the EFT (Version 12.0) published by Defra (2023). Model input parameters are summarised in Table A3-1 and, where considered necessary, discussed further below.

Table A3-1: Summary of Model Inputs

Model Parameter	Value Used
Terrain Effects Modelled?	No
Variable Surface Roughness File Used?	No
Urban Canopy Flow Used?	No
Advanced Street Canyons Modelled?	No
Noise Barriers Modelled?	No
Meteorological Monitoring Site	Cardiff
Meteorological Data Year	2022
Dispersion Site Surface Roughness Length (m)	1
Dispersion Site Minimum MO Length (m)	30
Met Site Surface Roughness Length (m)	0.2
Met Site Minimum MO Length (m)	1
Gradients?	No

A1.16 AADT flows, diurnal flow profiles, speeds, and vehicle fleet composition data have been determined from the interactive web-based map provided by DfT (2021), as well as an air quality assessment in support of the planning application for the nearby Former Orb Site Steelworks Phase 1 development in Newport (Kairus Ltd, 2024). The 2022 AADT flows have been factored forward to the future assessment year of 2028 using growth factors derived using the TEMPro System v7.2 (DfT, 2017). Traffic speeds have been estimated based on professional judgement, taking account of the road layout, speed limits and the proximity to a junction. The traffic data used in this assessment are summarised in Table A3-2. Diurnal and monthly flow profiles for the traffic have been derived from the national profiles published by DfT (2022).

Table A3-2: Summary of Traffic Data used in the Assessment

Road Link	2022		2028 (Without Scheme)		2028 (With Scheme)	
	AADT	%HDV	AADT	%HDV	AADT	%HDV
2	19279	7	20264	7	20314	7

Road Link	2022		2028 (Without Scheme)		2028 (With Scheme)	
	AADT	%HDV	AADT	%HDV	AADT	%HDV
3	19615	7	20617	7	20668	7
27	19279	7	20264	7	20314	7
28	19615	7	20617	7	20668	7
29	5003.5	5	5259	5	5259	5
6	5003.5	5	5259	5	5259	5
7	6307	9	6629	9	6629	9
8	6307	9	6629	9	6629	9
9	6307	9	6629	9	6629	9
10	6307	9	6629	9	6629	9
11	5003.5	5	5259	5	5259	5
12	5003.5	5	5259	5	5259	5
13	5003.5	5	5259	5	5259	5
14	19279	7	20264	7	20314	7
15	3984	6	4188	6	4188	6
16	3984	6	4188	6	4188	6
17	3984	6	4188	6	4188	6
18	19615	7	20617	7	20668	7
21	19615	7	20617	7	20668	7
22	19279	7	20264	7	20314	7
23	3984	6	4188	6	4188	6
24	3984	6	4188	6	4188	6
25	19615	7	20617	7	20668	7
26	19279	7	20264	7	20314	7
4	19279	7	20264	7	20314	7
1	19279	7	20264	7	20314	7
19	19615	7	20617	7	20668	7
5	19615	7	20617	7	20668	7
20	19615	7	20617	7	20668	7

A1.17 Figure A3.1 shows the road network included within the model, along with the speed at which each link was modelled.

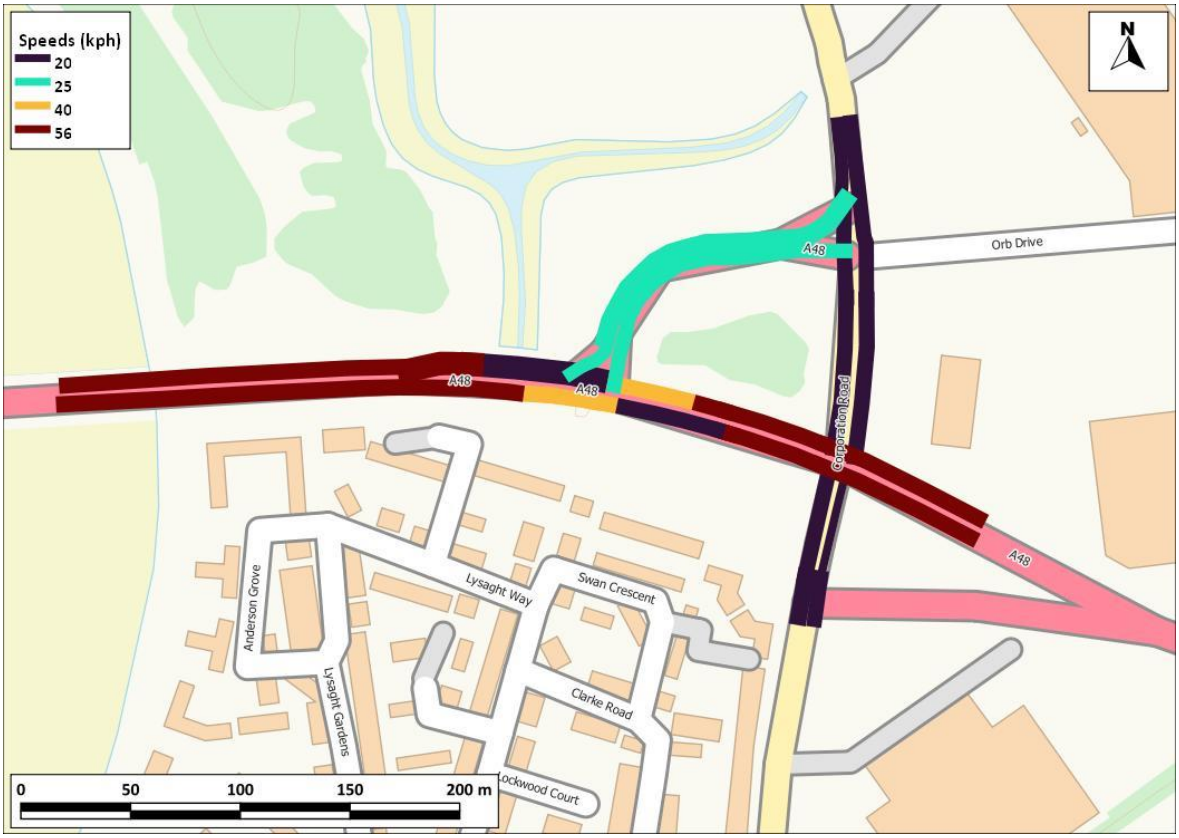

Figure A3-1: Road Network including Modelled Speed

A1.18 Hourly sequential meteorological data in sectors of 10 degrees from Cardiff for 2022 have been used in the model. The Cardiff meteorological monitoring station is located at Cardiff Airport, approximately 30 km southwest of the proposed development. It is deemed to be the nearest monitoring station representative of meteorological conditions in the vicinity of the proposed development; both the application site and the Cardiff meteorological monitoring station are located near the south coast of Wales where they will be influenced by the effects of coastal meteorology. A wind rose for the site for the year 2022 is provided in Figure A3-1. The station is operated by the UK Met Office. Raw data were provided by the Met Office and processed by AQC for use in ADMS.

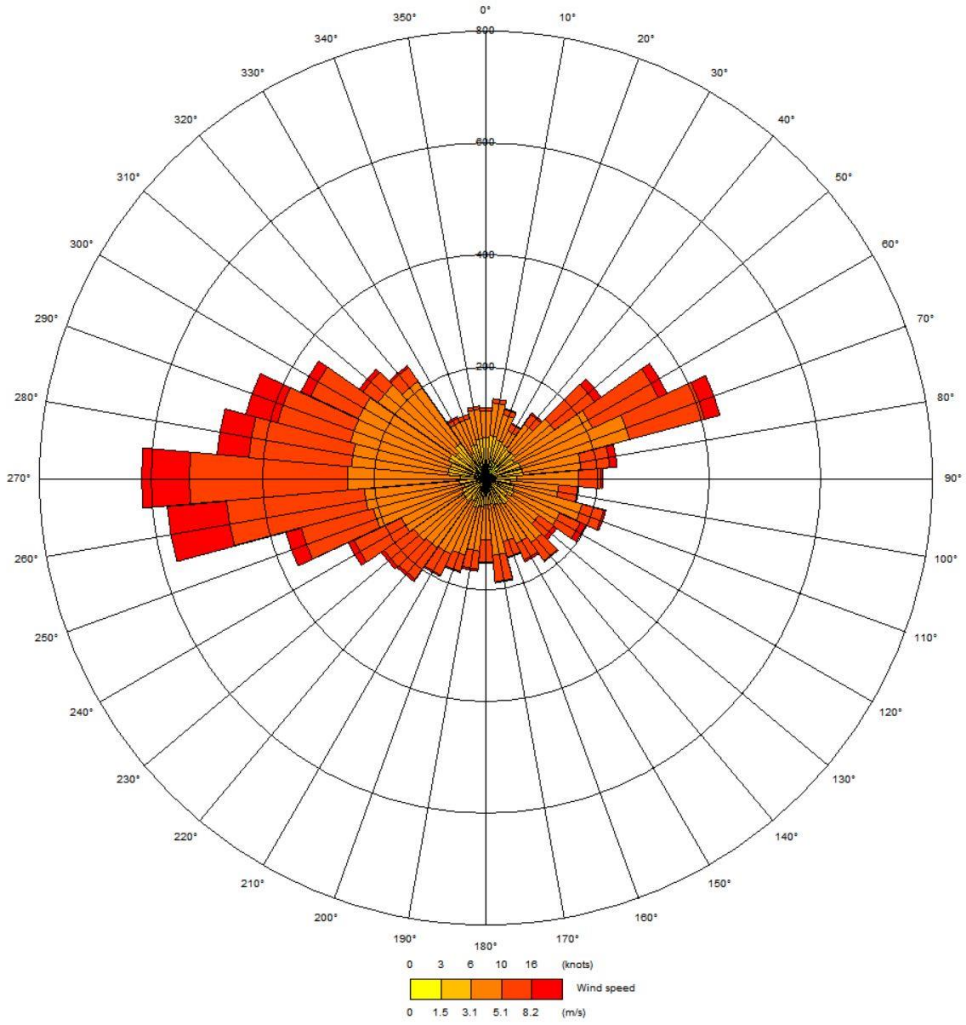

Figure A3-1: Wind Rose

Model Verification

A1.19 Evidence collected over many years has shown that, in most urban areas, dispersion modelling relying upon Defra's EFT has tended to under-predict roadside nitrogen dioxide concentrations. To account for this, it is often necessary to adjust the model against local measurements. However, the transect of receptors considered within this assessment is adjacent to a busy section of an a-road (dual-carriageway) in an open setting where the model is likely to over-predict nitrogen dioxide concentrations. The nearest nitrogen dioxide roadside or façade monitoring sites on Corporation Road where traffic has been assumed to be less free-flowing than the A48 and buildings are located in close proximity along Corporation Road and thus the model is likely to under-predict at these locations. As such using the monitoring data from the Corporation Road sites is not considered appropriate as it would likely lead to a large over-prediction of results. Therefore the modelled road-NOx concentrations were not adjusted in order to ensure as evidence suggests that the model performs well in open locations adjacent to roads with free flowing traffic.

Ammonia

A1.20 There are no local roadside ammonia monitoring sites which can be used to verify the model results for traffic-related ammonia emissions. Development of the CREAM emissions model (AQC, 2020) included verification of concentrations predicted using the ADMS-Roads dispersion model and

measured traffic data against ambient measurements from the most detailed network of roadside monitoring sites which has ever been run in the UK. No further adjustment to the model predictions is considered appropriate.

Post-processing

A1.21 The model predicts road-NOx concentrations at each receptor location, which, along with the background NO_2, has been processed through the NOx to NO_2 calculator available on the Defra LAQM Support website (Defra, 2023). The traffic mix within the calculator has been set to "All other urban UK traffic", which is considered suitable for the study area. The calculator predicts the component of NO_2 based on the adjusted road-NOx and the background NO_2.

Deposition Rates

A1.22 Deposition has not been included within the dispersion model because the principal depositing component of concern is nitrogen dioxide and this is calculated from nitrogen oxides outside of the model. Instead, deposition has been calculated from the predicted ambient concentrations using the deposition velocities set out in Table A3-3. Deposition velocities refer to a height above ground, typically 1 or 2 m, although in practice the precise height makes little difference and here they have been applied to concentrations predicted at a height of 1.5 m above ground. The velocities are applied simply by multiplying a concentration ($\mu g/m^3$) by the velocity (m/s) to predict a deposition flux ($\mu g/m^2/s$) and then scaling by time and area to represent kg/ha/yr of the nitrogen component of the molecule.

Table A3-3: Deposition Velocities Used in This Assessment

Pollutant	Deposition Velocity (m/s)	Reference
Nitrogen Dioxide	0.0015 m/s (Grassland)	AQTAG06 (AQTAG, 2011)
Ammonia	0.02 m/s (Grassland)	AQTAG06 (AQTAG, 2011)

A1.23 Wet deposition of the emitted pollutants close to the emission source will be restricted to wash-out, or below cloud scavenging. For this to occur, rain droplets must come into contact with the gas molecules before they hit the ground. Falling raindrops displace the air around them, effectively pushing gasses away. AQTAG06 guidance (AQTAG, 2011) is that the wet deposition of dioxide and ammonia is not significant within a short range. It has thus not been included.

A1.24 Deposition may have an acidifying effect through the release of acid protons during chemical transformation in the soil or biota. Thus, even alkaline gases such as ammonia can have an acidifying effect. The acidity CLos are expressed as equivalents ('eq'), referring to the molar equivalent of potential acidity. This is calculated from the mass (in g) of the deposited element, taking account of both its atomic mass and its valency. For example, the acidifying potential (in eq) of both ammonium (NH_4^+) and nitrate (NO_3^-) is 1/14 times the deposited mass in grammes (with 14 being the atomic mass of nitrogen). The species included in the calculation of acid deposition, and their calculated acidifying potentials, are set out in Table A3-4.

Table A3-4: Species Included in Acid Deposition Calculations

Pollutant	Calculation (kg deposition to keq)
N (from deposited NO_2, Ammonia)	0.071