One Earth Solar Farm

Volume 6.0 Environmental Statement [EN010159]

Volume 3: Technical Appendices Supporting ES Volume 2

Air Quality: Appendix 13.1 to 13.5

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Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 – Reg 5 (2) (a)

Contents

Glossary

AADT	Annual Average Daily Traffic
ADMS-Roads	Atmospheric Dispersion Modelling System model for Roads
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
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
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)
$\mu g/m^3$	Microgrammes per cubic metre
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)
NPPF	National Planning Policy Framework

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

List of Abbreviations and Acronyms

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.
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.
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal.

Appendix 13.1 Summary of Legislation, Policy and Technical Guidance

A.1.1 Legislation

EU Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

A.1.1.1. This EU directive established key overarching objectives in the field of air quality, incorporating targets to improve human health and environmental quality. Targets were specifically set for 12 different air pollutants to be managed by air quality standards. This directive set maximum thresholds of "fine particulate matter" across the EU, at 25 µg/m^3 for a yearly period.

The Environmental Protection Act (1990)

A.1.1.2. This Act set out the structure of emission control within England, Wales and Scotland. Particularly in regard to air quality, this act set controls which have worked toward reducing air pollution. Part III of the Act details information on statutory nuisances and associated penalties.

Environment Act (1995)

A.1.1.3. This Act established the Environment Agency and transferred to it powers over the control of pollution and the conservation and enhancement of natural resources and the environment. Part IV focuses specifically upon the management of air quality, and introduced the requirement for local authorities to evaluate air quality in their regions and develop actions if improvement is required, through the implementation of Air Quality Management Areas (AQMAs).

The Clean Air Act (1993)

A.1.1.4. This Act builds upon the original Clean Air Act 1956 (and subsequent amendments in 1968) and has an essential domestic regulatory role in controlling domestic and industrial air pollution, specifically smoke. Under section 20 of the Act, it is an offence to emit building, chimney or industrial plant smoke within a control area.

The Air Quality (England) Regulations (2000)

A.1.1.5. This is a set of regulations for England which help protect and enhance public health via the control and reduction of air pollution. This regulation sets limits upon ambient air pollutants, further establishing mechanisms for reporting and monitoring air quality.

The Air Quality (England) (Amendment) Regulations (2002)

A.1.1.6. The Air Quality (England) Regulations (2000) were amended in 2002 to include further information and objectives for Benzene. Further objectives were altered for carbon monoxide.

The Air Quality Standards Regulations (2010)

A.1.1.7. These regulations set legally binding limits for various pollutants including nitrogen and sulphur dioxide in ambient air. These regulations empowered local authorities to further develop action plans to address air quality concerns and look to improve baselines. These regulations clearly define how pollutants must be reported by local authorities.

The Environment Act 2021 (2021)

A.1.1.8. This legislation is part of a new post-Brexit legal framework in the UK for environmental protection. The Act makes provisions for targets, plans and policies toward general improvement of the natural environment. One of the key priority areas is air quality. Regulation 7 of the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023 set the target to work toward at least a 35% reduction in $PM_{2.5}$ population exposure by 2040, compared to levels established in 2018.

A.1.2 National Policy

Overarching National Policy Statement for Energy (EN-1) (2023)

A.1.2.1. This provides overarching government policy on energy NSIPs, how planning applications relating to energy will be assessed, and the way in which any impacts and mitigation measures will be considered. Part 5, Section 5.2 of this policy statement specifically relates to air quality and emissions.

A.1.2.2. Paragraph 5.2.8 to 5.2.9 states that *"Where the project is likely to have adverse effects on air quality the applicant should undertake an assessment of the impacts of the proposed project as part of the ES.*

The ES should describe:

- existing air quality concentrations and the relative change in air quality from existing levels;
- any significant air quality effects, mitigation action taken and any residual effects, distinguishing between the project stages and taking account of any significant emissions from any road traffic generated by the project;

- the predicted absolute emissions, concentration change and absolute concentrations as a result of the proposed project, after mitigation methods have been applied; and
- any potential eutrophication impacts."

National Planning Policy Framework (2024)

A.1.2.3. The National Planning Policy Framework (NPPF) is an overarching document which sets out government planning policy for England, and how this is expected to be applied by local authorities and developers. The NPPF provides a framework for local sustainable development via local plans. Specific extracts relating to our Project are as follows:

A.1.2.4. Section 15 relates to the conservation and enhancement of the natural environment. Paragraph 198 states that *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."*

A.1.2.5. Paragraph 199 states that *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan".*

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

A.1.2.6. In-line with the Environment Act 2021, this regulation sets two $PM_{2.5}$ targets, which require that:

"The annual mean concentration target is that by the end of 31st December 2040 that annual mean level of $PM_{2.5}$ in ambient air must be equal to or less than 10 µg/m^3.

The population exposure reduction target is that there is at least a 35% reduction in population exposure by the end of 31st December 2040 ("the target date"), as compared with the average population exposure in the three-

year period from 1st January 2016 to 31st December 2018 ("the baseline period"), determined in accordance with regulation 8."

Environmental Improvement Plan (2023)

A.1.2.7. This plan is a legal requirement as part of the Environment Act 2021 and presents a 5-year update to the delivery of the initial 25-Year Environment Plan. From an air quality standpoint, to deliver on the targets and commitments within the 25-Year Environment Plan, this document outlines the government's delivery approach:

"Continue to tackle domestic emissions by reducing the maximum emissions for domestic burning appliances in Smoke Control Areas and by promoting best practice in use of stoves and fireplaces.

Challenge local authorities to improve air quality more quickly by assessing their performance and use of existing powers, while supporting them with clear guidance, funding, and tools.

Facilitate the rollout of further Clean Air Zones by local councils in areas which are in breach of air quality statutory limits, with further zones and other non-clean air zone measures as required.

Re-align regional air quality zones in line with local government boundaries to drive effective coordinated action.

Reduce ammonia emissions by using incentives in our new farming schemes, while considering expanding environmental permitting conditions to dairy and intensive beef farms.

Continue to support the move away from petrol and diesel cars and consult on an extension to the existing North Sea Emission Control Area to cover the Irish Sea, reducing emissions from shipping."

Clean Air Strategy (2019)

A.1.2.8. This policy paper is an overarching summary of actions required across UK government to improve air quality. Broadly this document looks at reducing emissions from transport, homes, farming and other industry to progress towards meeting wider goals.

Air Quality Strategy (2007)

A.1.2.9. The Air Quality Strategy 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.

Air Quality Strategy (2023)

A.1.2.10. This strategy is the latest document to fulfil the statutory requirements contained within the Environment Act 1995 (as amended by the Environment Act 2021), and sets out the most up to date framework to deliver air quality objectives at a local authority level. The priorities of the strategy are to introduce planning reforms, build local capacity and awareness, boost active travel and public transport, reduce household pollution and improve enforcement of permits within industry.

Reducing Emissions from Road Transport: Road to Zero Strategy (2018)

A.1.2.11. This strategy specifically focuses on road transport and intervenes in the design and manufacturing sectors to reduce emissions from current vehicles, promote uptake of cleaner vehicles in future, and reduce emissions from road freight. This will be done through several different policy interventions.

UK plan for tackling nitrogen dioxide concentrations: an overview (2017) and Supplement (2018).

A.1.2.12. This plan is specifically aimed at reducing Nitrous Oxide pollution (NO_2) in the UK at a local authority level. The initial 2017 plan details interventions including investment into implementation and clean air funds, as well as investment into improving emissions from the bus network in the UK. The supplementary guidance in 2018 focuses on local authorities that have short term NO2 exceedances.

A.1.3 Local Policy

A.1.3.1. Local planning policy relevant to our Project is set out below. Local policies can be an important and relevant consideration for NSIPs as well, but in the event of any conflict, the NPS policy prevails.

Newark and Sherwood District Council (2023), Local Development Framework, Allocations and Development Management, Development Plan Document (AADMDPD). Submission Version, January 2024.

A.1.3.2. This amended local Development Plan Document (DPD) has been compiled to ensure that the wider development framework within Newark and Sherwood District Council sufficiently allocates land for development to meet the needs of the area, up until 2033. This DPD is currently under examination via the Secretary of State with an independent planning inspector appointed to consider our Project plan document. The document includes *"new and amended Housing and Affordable Housing Policies which replace those included in the Amended Core Strategy and new Gypsy Roma Traveller policies and allocations. The document also sets out amendments to urban boundaries and village envelopes, retail boundaries as well as sites requiring continued protection from development (open space and green infrastructure designations). It also includes a suite of Development Management policies to provide greater direction, help deliver specific allocations and assist in the day-to-day assessment of planning applications."*

A.1.3.3. Specific policies within the AADMDPD relevant to our Project include Policy DM10 "Pollution and Hazardous Materials" which states that *"Development proposals involving hazardous materials or the potential for pollution should take account of and address their potential impacts in terms of health, the natural environment, and general amenity on:*

1. Neighbouring land uses;

2. The wider population;

3. Ground and surface water;

4. Air quality; and

5. Biodiversity.

Proposals for potential point source polluters and other activities that have potential to lead to increased deposition of nitrogen should, as part of any planning application, consider the potential for effects on European sites and the scope for avoiding or mitigating these.

A conceptual site model should be prepared with an investigation report for the potential development site. A site investigation to confirm the conceptual site model should then be undertaken and, dependent upon findings, a remediation/mitigation plan with subsequent validations should then be agreed with the planning authority. Any impact should be balanced against the economic and wider social need for the development. Proposals should include necessary mitigation as part of the development or through off-site measures where necessary. Harmful development which cannot be made acceptable will be resisted.

Development proposals near hazardous substance installations, as defined on the Policies Map, or near development with the potential for significant pollution should take account of and address the potential risk arising from them. Any risk should be balanced against the economic and wider social need for the development. Development that would be put at an unacceptable risk from its proximity to such installations will be resisted.

Where a site is known, or highly likely to have been contaminated by a previous use, investigation of this and proposals for any necessary mitigation should form part of the proposal for redevelopment. Where contamination comes to light as part of the development process, the proposal will be determined in light of this.

Development proposals within and with the potential to impact on the Groundwater Source Protection Zone, as defined on the Policies Map, should address the potential risk through mitigation as part of the development or through off-site measures where necessary. Proposals that present an unacceptable risk to the Groundwater Source Protection Zone will be resisted.

All proposals will be required to address the Landscape Character of the District, in accordance with Core Policy 13 of the Amended Core Strategy and satisfy the criteria of other relevant Development Plan Documents."

Central Lincolnshire Local Plan (2023)

A.1.3.4. The Local Plan for the central Lincolnshire area sets out the approach to planning policy and overarching development allocations to drive growth in the area over a 20-year period. The Local Plan is contextualised into a wider vision, series of objectives and core policies toward delivery.

A.1.3.5. Specific policies detailed in the Local Plan and are relevant to our Project, as below.

A.1.3.6. Policy S14 *"Renewable Energy"* states that:

"The Central Lincolnshire Joint Strategic Planning Committee is committed to supporting the transition to a net zero carbon future and will seek to maximize appropriately located renewable energy generated in Central Lincolnshire (such energy likely being wind and solar based).

Proposals for renewable energy schemes, including ancillary development, will be supported where the direct, indirect, individual and cumulative impacts on the following considerations are, or will be made, acceptable. To determine whether it is acceptable, the following tests will have to be met:

i. The impacts are acceptable having considered the scale, siting and design, and the consequent impacts on landscape character; visual amenity; biodiversity; geodiversity; flood risk; townscape; heritage assets, their settings and the historic landscape; and highway safety and rail safety;

ii. The impacts are acceptable on aviation and defence navigation system/communications; and

iii. The impacts are acceptable on the amenity of sensitive neighbouring uses (including local residents) by virtue of matters such as noise, dust, odour, shadow flicker, air quality and traffic;

Testing compliance with part (i) above will be via applicable policies elsewhere in a development plan document for the area (i.e. this Local Plan; a Neighbourhood Plan, if one exists; any applicable policies in a Minerals or Waste Local Plan); and any further guidance set out in a Supplementary Planning Document.

In order to test compliance with part (ii) above will require, for relevant proposals, the submission by the applicant of robust evidence of the potential impact on any aviation and defense navigation system/communication, and within such evidence must be documented areas of agreement or disagreement reached with appropriate bodies and organizations responsible for such infrastructure.

In order to test compliance with part (iii) above will require, for relevant proposals, the submission by the applicant of a robust assessment of the potential impact on such users, and the mitigation measures proposed to minimize any identified harm.

For all matters in (i)-(iii), the applicable local planning authority may commission its own independent assessment of the proposals, to ensure it is satisfied what the degree of harm may be and whether reasonable mitigation opportunities are being taken.

Where significant adverse effects are concluded by the local planning authority following consideration of the above assessment(s), such effects will be weighed against the wider environmental, economic, social and community benefits provided by the proposal. In this regard, and as part of the planning balance, significant additional weight in favour of the proposal will arise for any proposal which is community-led for the benefit of that community.

In areas that have been designated for their national importance, as identified in the National Planning Policy Framework, renewable energy infrastructure will only be permitted where it can be demonstrated that it would be appropriate in scale, located in areas that do not contribute positively to the

objectives of the designation, is sympathetically designed and includes any necessary mitigation measures.

Additional matters for solar-based energy proposals

Proposals for solar thermal or photovoltaic panels and associated infrastructure to be installed on existing property will be under a presumption in favour of permission unless there is clear and demonstrable significant harm arising.

Proposals for ground-based photovoltaics and associated infrastructure, including commercial large-scale proposals, will be under a presumption in favour unless:

• There is clear and demonstrable significant harm arising; or

• The proposal is (following a site-specific soil assessment) to take place on Best and Most Versatile (BMV) agricultural land and does not meet the requirements of Policy S67; or

• The land is allocated for another purpose in this Local Plan or other statutory-based document (such as a nature recovery strategy or a Local Transport Plan), and the proposal is not compatible with such other allocation.

Proposals for ground-based photovoltaics should be accompanied by evidence demonstrating how opportunities for delivering biodiversity net gain will be maximized in the scheme taking account of soil, natural features, existing habitats, and planting proposals accompanying the scheme to create new habitats linking into the nature recovery strategy.

Additional matters for wind-based energy proposals

Proposals for a small to medium single wind turbine, which is defined as a turbine up to a maximum of 40m from ground to tip of blade, are, in principle, supported throughout Central Lincolnshire (i.e., the whole of Central Lincolnshire is identified as a broad area potentially suitable for such a single turbine), subject to meeting the above criteria (i)-(iii) and the requirements of national planning policy. Under this paragraph, no dwelling or other operation (e.g., a farm or a business) may have more than one turbine at any one time in the curtilage of that dwelling or other operation.

Proposals for medium (over 40m from ground to tip of blade) to large-scale wind turbines (including groups of turbines) will, in principle, be supported only where they are located within an area identified as a 'Broad Area Suitable for Larger Scale Wind Energy Turbines' as identified on the Policies Map and

(indicatively) on Map 2. Such proposals will be tested against criteria (i)-(iii) and the requirements of national planning policy.

Medium to large-scale wind turbines must not be within 2km of a settlement boundary of a settlement identified in the Settlement Hierarchy. However, where a proposal is within 2km of any residential property, the following matters will need careful consideration as to the potential harm arising:

• Noise

• Flicker

• Overbearing nature of the turbines (established by visual effects from within commonly used habitable rooms)

• Any other amenity which is presently enjoyed by the occupier.

In this regard, no medium to large-scale wind turbine within 700m of a residential property is anticipated to be supported, and proposals between 700-2,000m will need clear evidence of no significant harm arising.

For the avoidance of doubt, any medium to large-scale wind turbine proposals outside of the identified Broad Area Suitable for Larger Scale Wind Energy Turbines should be refused.

Decommissioning renewable energy infrastructure

Permitted proposals will be subject to a condition that will require the submission of an End of Life Removal Scheme within one year of the facility becoming non-operational, and the implementation of such a scheme within one year of the scheme being approved. Such a scheme should demonstrate how any biodiversity net gain that has arisen on the site will be protected or enhanced further, and how the materials to be removed would, to a practical degree, be re-used or recycled."

A.1.3.7. Policy S16: Wider Energy Infrastructure states that:

"The Joint Committee is committed to supporting the transition to net zero carbon future and, in doing so, recognises and supports, in principle, the need for significant investment in new and upgraded energy infrastructure.

Where planning permission is needed from a Central Lincolnshire authority, support will be given to proposals which are necessary for, or form part of, the transition to a net zero carbon sub-region, which could include: energy storage facilities (such as battery storage or thermal storage); and upgraded or new

electricity facilities (such as transmission facilities, sub-stations or other electricity infrastructure.

However, any such proposals should take all reasonable opportunities to mitigate any harm arising from such proposals, and take care to select not only appropriate locations for such facilities, but also design solutions (see Policy S53) which minimises harm arising."

A.1.3.8. Policy S53 "Design and Amenity" states that:

"All development, including extensions and alterations to existing buildings, must achieve high-quality sustainable design that contributes positively to local character, landscape, and townscape, and supports diversity, equality, and access for all.

Good design will be at the centre of every development proposal, and this will be required to be demonstrated through evidence supporting planning applications to a degree proportionate to the proposal.

Design Codes may be produced for parts of Central Lincolnshire or in support of specific developments. The approach taken in these Design Codes should be informed by the National Model Design Code, and where these codes have been adopted, developments will be expected to adhere to the Code.

Proposals for new buildings should incorporate the Design Principles for Efficient Buildings in Policy S6 at the centre of design.

All development proposals will be assessed against, and will be expected to meet, the following relevant design and amenity criteria. All development proposals will:

1. Context

a) Be based on a sound understanding of the context, integrating into the surroundings and responding to local history, culture, and heritage;

b) Relate well to the site, its local and wider context, and existing characteristics, including the retention of existing natural and historic features wherever possible and including appropriate landscape and boundary treatments to ensure that the development can be satisfactorily assimilated into the surrounding area;

c) Protect any important local views into, out of, or through the site;

2. Identity

a) Contribute positively to the sense of place, reflecting and enhancing existing character and distinctiveness;

b) Reflect or improve on the original architectural style of the local surroundings, or embrace opportunities for innovative design and new technologies which sympathetically complement or contrast with the local architectural style;

c) Use appropriate, high-quality materials which reinforce or enhance local

d) Not result in the visual or physical coalescence with any neighbouring settlement nor ribbon development;

3. Built Form

a) Make effective and efficient use of land that contributes to the achievement of compact, walkable neighbourhoods;

b) Be appropriate for its context and its future use in terms of its building types, street layout, development block type and size, siting, height, scale, massing, form, rhythm, plot widths, gaps between buildings, and the ratio of developed to undeveloped space both within a plot and within a scheme;

c) Achieve a density not only appropriate for its context but also taking into account its accessibility;

d) Have a layout and form that delivers efficient and adaptable homes in accordance with Policy S6 and Policy S20.

4. Movement

a) Form part of a well-designed and connected travel network with consideration for all modes of transport offering genuine choices for non-car travel and prioritizing active travel and where relevant demonstrate this through evidence clearly showing connectivity for all modes and a hierarchy of routes (also see Policy S47 and Policy S48);

b) Maximize pedestrian and cycle permeability and avoid barriers to movement through careful consideration of street layouts and access routes both within the site and in the wider context contributing to the delivery of walkable and cyclable neighbourhoods in accordance with Policy S48;

c) Ensure areas are accessible, safe, and legible for all including people with physical accessibility difficulties;

d) Deliver well-considered parking, including suitable electric vehicle charging points, with appropriate landscaping provided in accordance with the parking standards set out in Policy NS18 and Policy S49;

e) Deliver suitable access solutions for servicing and utilities;

5. Nature

a) Incorporate and retain as far as possible existing natural features including hedgerows, trees, and water bodies particularly where these features offer a valuable habitat to support biodiversity, aligned with policies in the Natural Environment chapter of the Local Plan;

b) Incorporate appropriate landscape and boundary treatments to ensure that the development can be satisfactorily assimilated into the surrounding area, maximizing opportunities to deliver diverse ecosystems and biodiverse habitats, strengthening wildlife corridors and green infrastructure networks, and helping to achieve wider goals for biodiversity net gain, climate change mitigation and adaptation and water management;

6. Public Spaces

a) Ensure public spaces are accessible to all, are safe and secure and will be easy to maintain with clear definition of public and private spaces;

b) Form part of a hierarchy of spaces where relevant to offer a range of spaces available for the community and to support a variety of activities and encourage social interaction;

c) Be carefully planned and integrated into the wider community to ensure spaces feel safe and are safe through natural surveillance, being flanked by active uses and by promoting activity within the space;

d) Maximize opportunities for delivering additional trees and biodiversity gains through the creation of new habitats and the strengthening or extending wildlife corridors and the green infrastructure network in accordance with policies in the Natural Environment chapter;

7. Uses

a) Create or contribute to a variety of complementary uses that meet the needs of the community;

b) Be compatible with neighbouring land uses and not result in likely conflict with existing uses unless it can be satisfactorily demonstrated that both the ongoing use of the neighbouring site will not be compromised, and that the

amenity of occupiers of the new development will be satisfactory with the ongoing normal use of the neighbouring site;

c) Not result in adverse noise and vibration taking into account surrounding uses nor result in adverse impacts upon air quality from Odour, fumes, smoke, dust and other sources;

8. Homes and Buildings

a) Provide homes with good quality internal environments with adequate space for users and good access to private, shared or public spaces;

b) Be adaptable and resilient to climate change and be compatible with achieving a net-zero carbon Central Lincolnshire as required by Policies S6, S7, and S8;

c) Be capable of adapting to changing needs of future occupants and be cost-effective to run by achieving the standards set out in Policy S20;

d) Not result in harm to people's amenity either within the proposed development or neighbouring it through overlooking, overshadowing, loss of light or increase in artificial light or glare;

e) Provide adequate storage, waste, servicing and utilities for the proposed use;

9. Resources

a) Minimize the need for resources both in construction and operation of buildings and be easily adaptable to avoid unnecessary waste in accordance with Policies S10 and S11;

b) Use high-quality materials which are not only suitable for the context but that are durable and resilient to impacts of climate change in accordance with the requirements of Policy S20;

10. Lifespan

a) Use high-quality materials which are durable and ensure buildings and spaces are adaptive; and

b) Encourage the creation of a sense of ownership for users and the wider community with a clear strategy for ongoing management and stewardship.

Development proposals will be expected to satisfy requirements of any adopted local design guide or design code where relevant to the proposal."

Bassetlaw District Council (2011) Local Development Framework, Publication Core Strategy and Development Management Policies

A.1.3.9. The Core Strategy for the Bassetlaw District sets out the overarching vision for the area up until 2026, including the policy approach to deliver this.

A.1.3.10. Policy DM10 *"Renewable and Low Carbon Energy"* is related to the Proposed Development and states:

"The Council will be supportive of proposals that seek to utilize renewable and low-carbon energy to minimize CO2 emissions. Proposals for renewable and low-carbon energy infrastructure will need to demonstrate that they:

- Are compatible with policies to safeguard the built and natural environment, including heritage assets and their setting;

- Will not lead to the loss of or damage to high-grade agricultural land;

- Are compatible with tourism and recreational facilities;

- Will not result in unacceptable impacts in terms of visual appearance, landscape character, noise, shadow-flicker, watercourse engineering and hydrological impacts, pollution, traffic generation, or loss of features of recognized importance for biodiversity;

- Will not result in an unacceptable cumulative impact in relation to the factors above.

Large-scale renewable and low-carbon energy proposals must provide full details of arrangements for decommissioning and reinstatement of the site if/when it ceases to operate.

B. District Heating and Co-location

Proposals for new development in District Heating Opportunity Areas (as identified on the Energy Opportunities Diagram) will, where the scale of the proposal permits, be expected to demonstrate consideration of District Heating as a means of achieving carbon compliance. District Heating opportunities include those supplied by heat from waste management sites, power stations, coal mine methane facilities or new standalone infrastructure. Applicants will be expected to engage with the Council at pre-application stage to assess the feasibility of achieving this objective. Where District Heating Networks are established, all subsequent new development close enough to connect to such

a network will be expected to do so where there are no barriers to this connection. Proposals for heat-producing development will be expected to demonstrate consideration of the feasibility of utilizing its waste heat for heat-consuming development. Support will be given to proposals that will ensure the co-location of compatible heat-producing and heat-consuming development.

C. Major Development

Major development proposals will be expected to deliver specific low-carbon and renewable energy infrastructure in line with assessments of feasibility and overall viability.

D. Community Energy Schemes

Support will be given to community-led energy schemes in line with the Council's Renewable and Low Carbon Energy Study (or subsequent replacement), on exception sites, if necessary, where strong local support is demonstrated."

Bassetlaw Local Plan 2020-2038 (2024)

A.1.3.11. This Local Plan sets out Bassetlaw District's planning and policy framework, development strategy and site allocations to inform effective delivery of the overall vision up until 2038.

A.1.3.12. Policies set out in the Local Plan relate to the Proposed Development.

A.1.3.13. Policy ST51 "Renewable Energy Generation" states that:

"Development that generates, shares, transmits and/or stores zero carbon and/or low carbon renewable energy including community energy schemes will be supported subject to the satisfactory resolution of all relevant site specific and cumulative impacts upon:

a) Location, setting and position in the wider landscape, resulting from its siting and scale;

b) Natural and heritage assets and their settings;

c) Air and water quality;

d) Hydrology and hydrogeology;

e) The best and most versatile agricultural land;

f) Existing highway capacity and highway safety;

g) Noise, light, glare, smell, dust, emissions or flicker;

h) Aviation and radar; and

i) Recreation and local amenity.

Proposals must take into account operational and approved developments, as well as any proposed intensification to operational or approved proposals. Proposals involving one or more wind turbines will be supported where:

a) the site is located within an area defined as being suitable for wind energy in a made neighbourhood plan or development plan document; and

b) following consultation, it can be satisfactorily demonstrated that all potential adverse planning impacts identified by affected local communities have been fully addressed, including cumulative impacts identified in Part 1 above.

All renewable energy development will be expected to provide details of the expected power generation based upon expected yield or local self-consumption to enable effective monitoring of the district's contribution to the national zero carbon targets.

A decommissioning programme applied by a Condition to any planning permission granted will be required to demonstrate that the site can be returned to an acceptable state, three years after cessation of operations."

A.1.4 Guidance

Planning Practice Guidance, Air Quality (2019)

A.1.4.1. This document provides information on how the planning process can take into account the influence of new proposals upon air quality. This guidance details which air quality issues planning can address, assessment parameters, and answers further key questions surrounding the production of air quality reports.

Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) Guidance: Land-Use Planning & Development Control: Planning for Air Quality (2017)

A.1.4.2. The EPUK and IAQM have jointly produced guidance to help ensure that air quality considerations are included within the planning and development control process across the UK. This document is aimed at local authorities as well as developers. The guidance outlined here is particularly relevant for

helping to assess changed in air quality exposure resulting from new mixed-use developments.

IAQM Guidance on the Assessment of Dust from Demolition and Construction (2024) [1]

A.1.4.3. This guidance document is aimed at general practitioners and developers, and details how to undertake an assessment of impacts from construction practices from a proposed development. Regarding air quality, the guidance focuses on dust emissions and quantifies its risk, to then formulate the level and type of mitigation measures required.

Defra Local Air Quality Management Technical Guidance (TG22) (2022)

A.1.4.4. This is a technical guidance document to aid local authorities to carry out their statutory duties under the Environment Act 1995 (as amended) in regard to air quality. In summary therefore, this guidance helps authorities to improve air quality through the effective declaration of air quality non-compliance and subsequent action plans to address these localised issues.

[1] IAQM (2024) Guidance on the Assessment of Dust from Demolition and Construction v2.2, [Online], Available: http://iaqm.co.uk/guidance/.

Appendix 13.2 Construction Dust Assessment Procedure

A.1.4.5. The criteria developed by IAQM divide the activities on construction sites into four types to reflect their different potential impacts. These are:

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

A.1.4.6. The assessment procedure includes the four steps summarised below.

STEP 1: Screen the Need for a Detailed Assessment

A.1.4.7. 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).

A.1.4.8. 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

A.1.4.9. 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).

A.1.4.10. 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

A.1.4.11. 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 A13.2.1.

Table A13.2.1: 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

A.1.4.12. 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.

A.1.4.13. 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 A13.2.2. These receptor sensitivities are then used in the matrices set out in Table A13.2.3, Table A13.2.4 and Table A13.2.5 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

A.1.4.14. 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 A13.2.6 as a method of assigning the level of risk for each activity.

STEP 3: Determine Site-specific Mitigation Requirements

A.1.4.15. 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 13.6.

STEP 4: Determine Significant Effects

A.1.4.16. 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'.

A.1.4.17. 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 A13.2.2: 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	playing fields, farmland (unless commercially-sensitive horticulture), footpaths, short term car parks and roads

	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	
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 A13.2.3: Sensitivity of the Area to Dust Soiling Effects on People and Property

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 A13.2.4: Sensitivity of the Area to Human Health Effects[14]

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

Table A13.2.5: Sensitivity of the Area to Ecological Effects[14]

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

Table A13.2.6: 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

Appendix 13.3 EPUK & IAQM Planning for Air Quality Guidance

A.1.4.18. The guidance issued by EPUK and IAQM 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.

A.1.5 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".*

A.1.6 Recommended Best Practice

A.1.6.1. 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".

A.1.6.2. 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.

A.1.6.3. 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.

A.1.6.4. 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".

A.1.6.5. 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.

A.1.7 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

A.1.7.1. 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.

A.1.7.2. 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.

A.1.7.3. 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.

A.1.7.4. 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.

A.1.7.5. 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/Nm³.

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".

A.1.7.6. 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".

A.1.7.7. 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".

A.1.7.8. 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 chapter.

Assessment of Significance

A.1.7.9. 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.

A.1.7.10. 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.

A.1.7.11. 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.

A.1.7.12. 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 XX.

Appendix 13.4 Modelling Methodology

A.1.8 Model Inputs

A.1.8.1. 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). Vehicle emissions have been calculated based on vehicle flow, composition and speed data using the EFT (Version 12.0) published by Defra[2]. Model input parameters are summarised in Table A13.4.1 and, where considered necessary, discussed further below.

Table A13.4.1: Summary of Model Inputs

Model Parameter	Value Used
Terrain Effects Modelled?	No
Variable Surface Roughness File Used?	Yes – 12km x 12km Cartesian grid at 50m resolution
Urban Canopy Flow Used?	No
Advanced Street Canyons Modelled?	No
Noise Barriers Modelled?	No
Meteorological Monitoring Site	Waddington
Meteorological Data Years	2022
Dispersion Site Surface Roughness Length (m)	N/A (variable surface roughness file used)
Dispersion Site Minimum MO Length (m)	1
Met Site Surface Roughness Length (m)	0.3
Met Site Minimum MO Length (m)	1
Gradients?	No

[2] Defra (2024) Local Air Quality Management (LAQM) Support Website, [Online], Available: http://laqm.defra.gov.uk/.

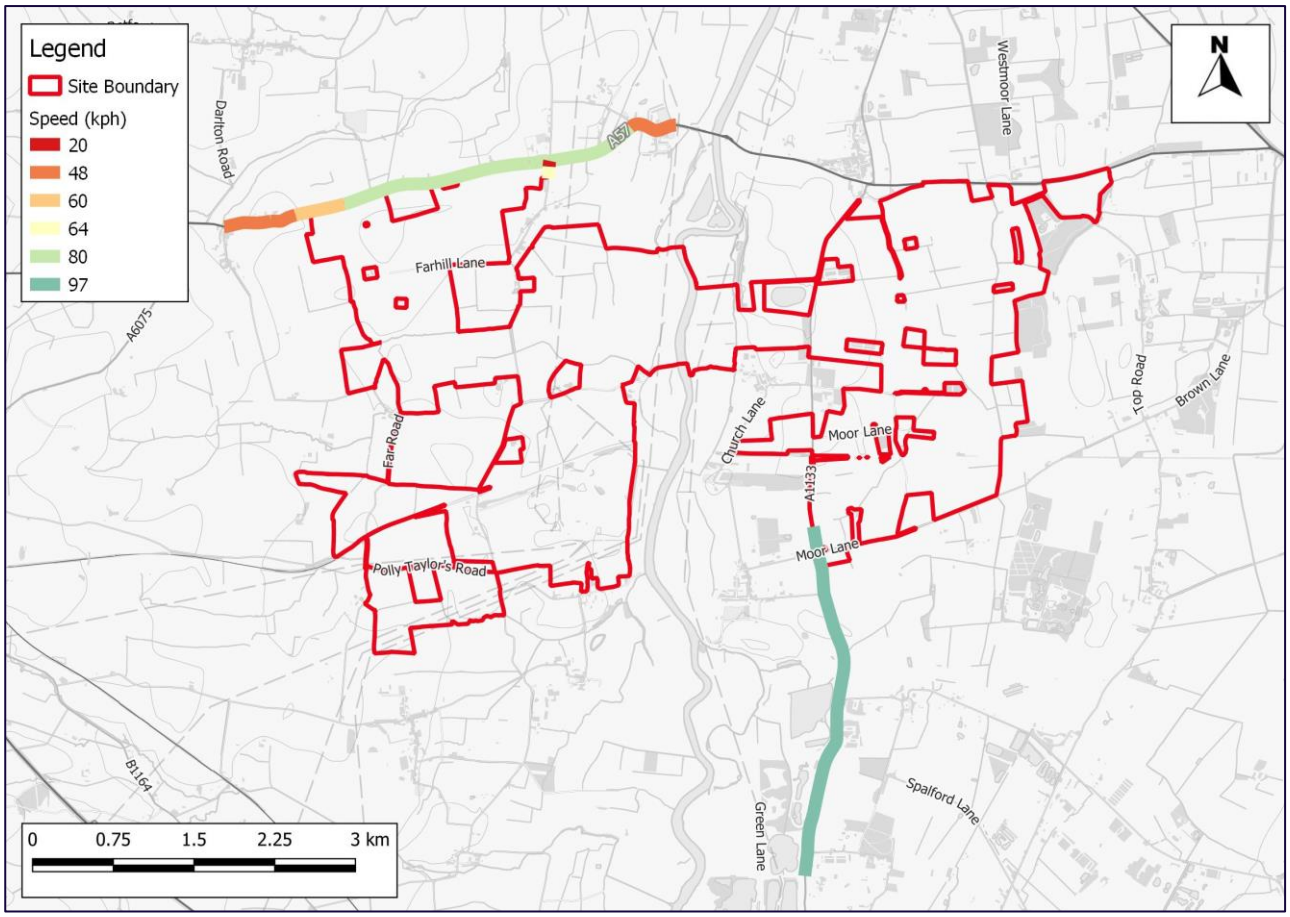
A.1.8.2. AADT flows and the proportions of HDVs have been provided by Pell Frischmann, who have undertaken the transport assessment work for the proposed development. Traffic speeds have been estimated based on professional judgement, taking account of the road layout, speed limits and the proximity to a junction. The traffic data used in this assessment are summarised in Table A13.4.2. Diurnal and monthly flow profiles for the traffic have been derived from the national profiles published by DfT (2023b).

Table A13.4.2: Summary of Traffic Data used in the Assessment

Road Link	2022 Baseline		2027 No Development		2027 With Development	
	AADT	%HDV	AADT	%HDV	AADT	%HDV
A57 West of Dunham	9,175	11.4	9,833	13.5	10,214	15.9
A57 Dunham	9,175	11.4	9,609	11.8	9,659	11.8
A1133 South of South Clifton	4,062	44.9	4,213	45.2	4,415	47.6
Main Street South of Ragnall	1,134	8.9	1,482	22.5	1,522	23.4

A.1.8.3. Figure A13.4.1 shows the road network included within the model, along with the speed at which each link was modelled.

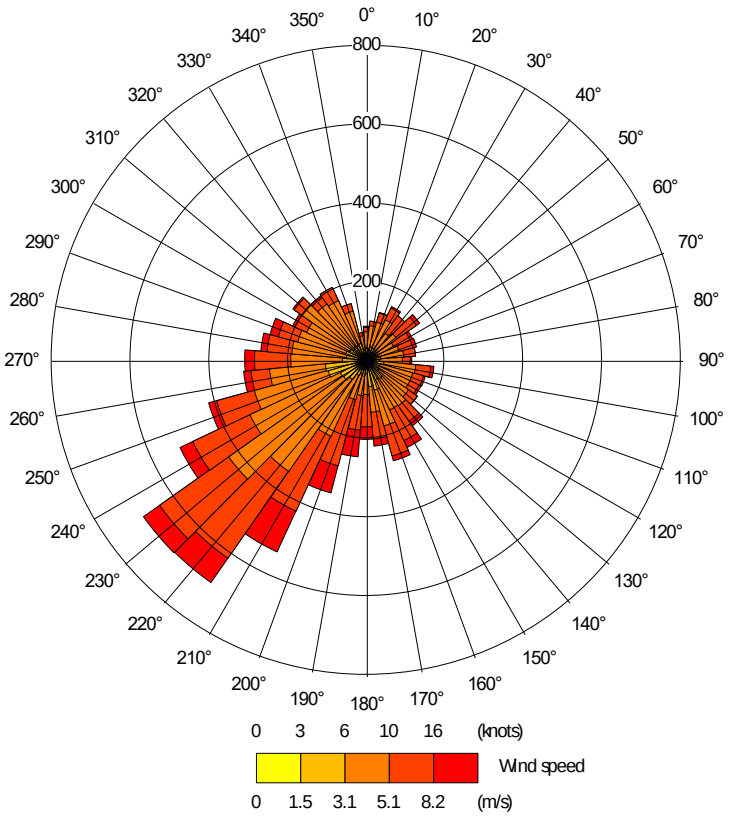
Figure A13.4.1: Modelled Roads and Speeds (kph)



Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

A.1.8.4. Hourly sequential meteorological data in sectors of 10 degrees from Waddington for 2022 have been used in the model. The meteorological monitoring station is located at RAF Waddington, approximately 15 km to the east of the proposed development. Both the application site and the meteorological monitoring station are located in the east of England where they will be influenced by the effects of inland meteorology over flat-lying topography. The topography of the model domain is similar to that around the meteorological monitoring station and measurements from this site are considered to provide the most robust basis to predict meteorology within the model domain. A wind rose for the site for 2022 is provided in Figure A13.4.2. Raw data were provided by the Met Office and processed by AQC for use in ADMS.

Figure A13.4.1: Wind Rose for Waddington 2022



A.1.9 Model Verification

A.1.9.1. Evidence collected over many years has shown that, in most urban areas, dispersion modelling relying upon Defra's EFT has tended to systematically under-predict roadside nitrogen dioxide (NO_2) concentrations. To account for this, it is necessary to adjust the model against local measurements. The model has been run to predict annual mean NO_2 concentrations during 2022 at the DT22 diffusion tube monitoring site operated by Bassetlaw District Council, which is the only monitor in proximity to the Site.

NO_2

A.1.9.2. Most NO_2 is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions of nitrogen oxides (NOx = NO + NO_2).

A.1.9.3. The model output of road-NOx (i.e. the component of total NOx coming from road traffic) has been compared with the 'measured' road-NOx. Measured road-NOx has been calculated from the measured NO_2 concentration and the predicted background NO_2 concentration using the NOx from NO_2 calculator (Version 8.1) available on the Defra LAQM Support website[2].

A.1.9.4. An adjustment factor has been determined as the ratio of the 'measured' road contribution and the model derived road contribution. This factor has then been applied to the modelled road-NOx concentration for each receptor to provide adjusted modelled road-NOx concentrations. The total nitrogen dioxide concentrations have then been determined by combining the adjusted modelled road-NOx concentrations with the predicted background NO_2 concentration within the NOx to NO_2 calculator[2].

A.1.9.5. The data used to calculate the adjustment factor are provided below:

- Measured NO_2 : 17.2 µg/m^3
- Background NO : 7.4 µg/m^3
- 'Measured' road-NOx (using NOx from NO_2 calculator): 18.1 µg/m^3
- Modelled road-NOx = 3.3 µg/m^3
- Road-NOx adjustment factor: 18.1/3.3 = 5.5

A.1.9.6. The factor implies that the unadjusted model is under-predicting the road-NOx contribution. This is a common experience with this and most other road traffic emissions dispersion models.

PM_{10} and $PM_{2.5}$

A.1.9.7. The approach described above for NOx and nitrogen dioxide determines the road increment of concentrations by subtracting the predicted local background from the roadside measurements. This works well for NOx because the differences between roadside and background concentrations typically represent a large proportion of the total measured value. The same is not true for PM_{10} and $PM_{2.5}$ concentrations, which are dominated by non-road emissions, even at the roadside. In practice, the influence of a local road on concentrations can often be smaller than the uncertainty in the mapped background concentration. As an example of this, 31% of all roadside and kerbside sites in London which measured $PM_{2.5}$ in 2019 with >75% data capture, recorded an annual mean concentration lower than the equivalent Defra mapped background value. Using measured background concentrations does not provide any significant benefit, owing largely to the spatial resolution of available measurements, but also because of measurement uncertainty. For example, hourly-mean $PM_{2.5}$ concentrations measured at roadside sites are often lower than those measured at nearby urban background sites, while concentrations at urban background sites are often lower than those measured at rural sites.

A.1.9.8. For these reasons, it is not appropriate to calculate the annual mean road-increment to PM_{10} and $PM_{2.5}$ concentrations by subtracting either the mapped background or a local measured background concentration. This, in turn, means that the approach to model adjustment which is described for NOx and

NO_2 is not appropriate for PM_{10} and $PM_{2.5}$. Historically, many studies have derived a model adjustment factor for NOx and applied this to PM_{10} and $PM_{2.5}$. This is also not appropriate, since there is no reason to expect the same bias in emissions of NOx, PM_{10} and $PM_{2.5}$.

A.1.9.9. While there is very strong evidence that EFT-based models have consistently under-predicted road-NOx concentrations in urban areas, there is no equivalent evidence for PM_{10} and $PM_{2.5}$. There is currently no strong basis for applying any adjustment to the model outputs. Predicted concentrations of PM_{10} and $PM_{2.5}$ have thus not been adjusted.

A.1.10 Post-processing

A.1.10.1. The model predicts road-NOx concentrations at each receptor location. These concentrations have been adjusted using the adjustment factor set out above, which, along with the background NO_2, has been processed through the NOx to NO_2 calculator available on the Defra LAQM Support website[2]. The traffic mix within the calculator has been set to “All non-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.

Appendix 13.5 Construction Dust Mitigation

A.1.10.2. Table A13.6.1 sets out a list of best-practice measures from the IAQM guidance[1] 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 A13.6.1: Best-Practice Mitigation Measures Recommended for the Works

Measure	Desirable	Highly Recommended
Communications		
Develop and implement a stakeholder communications plan that includes community engagement before and during work on site		✓
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the 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		✓

Hold regular liaison meetings with other high risk construction sites within 250 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes	✓
Monitoring	
Undertake daily on-site and off-site inspections where receptors (including roads) are nearby, to monitor dust. Record inspection results, and make the log available to the Local Authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary, with cleaning to be provided if necessary	✓
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	✓
Avoid site runoff of water or mud	✓
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 (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate)	✓
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials	✓
Implement a Travel Plan that supports and encourages sustainable staff travel (public transport, cycling, walking, and car-sharing)	✓
Operations	
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems	✓
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate	✓
Use enclosed chutes, 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 Earthworks	
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable	✓

Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable		✓
Only remove the cover from small areas during work, not all at once		✓
Measures Specific to Construction		
Avoid scabbling (roughening of concrete surfaces), if possible		✓
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place		✓
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery		✓
For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust	✓	
Measures Specific to Trackout		
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use		✓
Avoid dry sweeping of large areas		✓
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport		✓
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable; only if the site is large enough for haul routes		✓
Record all inspections of haul routes and any subsequent action in a site log book; only if recommending the inspections above		✓
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems or mobile water bowsers, and regularly cleaned; only if the site is large enough for haul routes		✓

Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable); only if the site is large enough to justify this	✓
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and only if recommended wheel wash	✓
Access gates should be located at least 10 m from receptors, where possible	✓

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