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Environmental Statement

Interim Environmental Report (IER) Volume 1, Chapter 18: Air Quality

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18 Air quality

18.1 Introduction

18.1.1 This chapter of the Environmental Statement (ES) presents the findings of the Environmental Impact Assessment (EIA) of effects on the environment with respect to air quality as a result of the Scheme.

18.1.2 This chapter identifies and proposes measures to address the potential impacts and likely significant effects on the environment with respect to air quality during the construction, operation and maintenance, and decommissioning phases.

18.1.3 The information presented within this chapter has been informed by the Scheme information and description provided in Volume 1, Chapter 2 Scheme description.

18.2 Scope of assessment

18.2.1 Chapter 5, Section 5.5 of the Environmental Impact Assessment Scoping Report[1] addressed the potential for the Scheme to result in significant effects on air quality for the construction, operational and decommissioning phases and consequently whether a standalone topic chapter was required in the ES.

18.2.2 Through the adoption of the Scoping Opinion[2], the Secretary of State has confirmed that air quality assessment should be included in the ES and must assess the scope set out in Table 18-1.

Table 18-1 Air quality topics scoped in / out

Topic	Scoped in / out			Justification
	Construction phase and panel/battery replacement	Operational phase (routine maintenance)	Decommissioning phase	
Construction Dust	Scoped out	Scoped out	Scoped out	A construction dust risk assessment will be undertaken to determine the potential for dust and particulate emissions during the construction phase and to identify appropriate mitigation measures using the Institute of Air Quality Management (IAQM) Construction Dust Guidance. This will be secured by the outline Construction Environmental Management Plan (oCEMP). Decommissioning is expected to have impacts no worse than those of construction, with mitigation secured via the outline Decommissioning Environmental Management Plan (oDEMP). Following receipt of the Scoping Opinion, no further changes to the scope above are proposed.
Construction & decommissioning road traffic emissions	Scoped in	N/A	Scoped in	Construction traffic will be managed through a Construction Traffic Management Plan (CTMP), which will set out measures to minimise construction vehicle related impacts (e.g. avoiding villages and AQMAs). Decommissioning traffic is expected to have impacts no worse than those of construction, with mitigation secured via the oDEMP. Following receipt of the Scoping Opinion these matters are scoped into the assessment.

[1] Arrow Valley Solar Limited (2026) Arrow Valley Solar. Environmental Impact Assessment Scoping Report. Volume I: Main Report (Document Reference AVS-ATR-GEN-AA-DOC-ENV-000001, Rev. A). Planning Inspectorate Reference EN0110033.
Available at: https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110033-000002-20260327%20Arrow%20Valley%20EIA%20Scoping%20Report%20Volume%201%20Main%20Report%20Rev.%20A.pdf.

[2] Planning Inspectorate (2026) Scoping Opinion: Proposed Arrow Valley Solar (Case Reference EN0110033). Adopted on behalf of the Secretary of State pursuant to Regulation 10 of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, 7 May 2026.
Available at: https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0110033-000010-Arrow%20Valley%20Solar%20Scoping%20Opinion.pdf

Topic	Scoped in / out			Justification
	Construction phase and panel/battery replacement	Operational phase (routine maintenance)	Decommissioning phase	
Exhaust emissions from NRRM	Scoped in	N/A	Scoped in	At this early stage of Scheme development, there is limited detail on type and number of construction plant and non-road mobile machinery (NRMM). However, emissions would be controlled through compliance with appropriate standards as set in NRMM regulations[13] and application of best practice measures, to be secured via the oCEMP and. Decommissioning is expected to have impacts no worse than those of construction, with mitigation secured via the oDEMP. Following receipt of the Scoping Opinion, the Planning Inspectorate considered that insufficient information had been provided regarding the type, number and location of plant and NRMM and did not agree to scope out this matter. Following receipt of the Scoping Opinion these matters are scoped into the assessment.
Operational Traffic	N/A	Scoped out	N/A	Operational traffic is expected to be limited to occasional maintenance visits, and the scale of these movements is sufficiently low that no further air quality assessment is required in this respect. Operational traffic impacts will be managed through an outline Operational Management Plan (oOEMP). Following receipt of the Scoping Opinion, the Planning Inspectorate agreed that operational traffic emissions could be scoped out, subject to the ES providing information on the type, scale and frequency of operational vehicle movements and demonstrating that these remain below the relevant EPUK/IAQM thresholds (see Section 2. Method of assessment). Accordingly, this matter remains scoped out of the assessment. Following receipt of the Scoping Opinion, no further changes to the scope above are proposed.
Combustion Plant	Scoped out	Scoped out	Scoped out	The Scheme provides a clean and renewable source of energy in its day to day running, which does not contain any sources of air quality emissions, ancillary combustion process or combustion-based power generation. Following receipt of the Scoping Opinion, the Planning Inspectorate agreed with this approach, subject to the ES confirming that no operational plant emissions requiring further assessment would arise. As set out in Volume 1, Chapter 2 Scheme description, no operational that could generate emissions are proposed. Accordingly, this matter remains scoped out of the assessment. Following receipt of the Scoping Opinion, no further changes to the scope above are proposed.
Emissions from BESS Fire Event	Scoped out	Scoped out	Scoped out	Operational emissions associated with a potential Battery Energy Storage System (BESS) fire will be dealt with in the outline Battery Safety Management Plan (oBSMP). It is unlikely that this effect will arise. Following receipt of the Scoping Opinion, no further changes to the scope above are proposed.

Additional commentary on scope of air quality assessment

18.2.3 The Cable Route Corridor (CRC) for transmission of energy from the Sites to the Point of Connection (PoC) will be buried in trenches typically created by open cut method. Where there are road or river crossings, trenchless techniques such as horizontal directional drilling (HDD) are likely to be the method of choice. However, should construction of the cable route require any open cut road crossings, full or partial road closures may be required. Temporary traffic management and / or diversions will be installed, and the duration of such works would be kept as short as practicable. Any effect on local pollutant concentrations due to traffic management will be short term and temporary is not considered to be significant, and so will not be considered further in the impact assessment. Traffic management measures will be set out in the oCTMP and decommissioning traffic management plan (required as part of the oDEMP) and will be secured by Requirement and require approval from Local Highway Authorities.

18.3 Consultation

Consultation to date

18.3.1 No consultation with stakeholders has been undertaken to date. Local authority air quality officers will be consulted on methodology if assessment screening criteria for construction traffic are exceeded.

18.4 Legislation, policy, and guidance

Legislation

18.4.1 The below listed legislation has been taken into account in the air quality assessment. Volume 3, Appendix 18.1 Legislation, policy and guidance relevant to the air quality assessment, provides further detail on how the below listed legislation has informed the air quality assessment:

- Environment Act 2021[3];
- Environmental Protection Act 1990[4];
- The Air Quality Standards Regulations 2010[5];
- The Air Quality Standards (Amendment) Regulations 2016[6], further amended by SI 2019 No.74[7] and SI 2020 No.1313[8] to account for the UK's departure from the European Union[9] The Environmental Permitting (England and Wales) Regulations 2016[10];
- Air Quality (England) Regulations 2000 (as amended)[11];
- The Environment Targets (Fine Particulate Matter) (England) Regulations 2023[12]; and
- Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018[13].

Policy

18.4.2 The below listed policy has been taken into account in the air quality assessment. Volume 3, Appendix 18.1 Legislation, policy and guidance relevant to the air quality assessment, provides further detail on how the below listed policy has informed the air quality assessment:

- Overarching National Policy Statement (NPS) for Energy (EN-1)[14];
- NPS for Renewable Energy (EN-3)[15];
- NPS for Electricity Networks (EN-5)[16];

[3] The Environment Act 2021. Available at: https://www.legislation.gov.uk/ukpga/2021/30/contents
[4] Environmental Protection Act 1990. Available at: https://www.legislation.gov.uk/ukpga/1990/43/contents
[5] The Air Quality Standards Regulations 2010. Available at: https://www.legislation.gov.uk/uksi/2010/1001/contents
[6] The Air Quality Standards (Amendment) Regulations 2016. Available at: https://www.legislation.gov.uk/uksi/2016/1184/contents/made
[7] The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (legislation.gov.uk). Available at: https://www.legislation.gov.uk/uksi/2019/74/contents/made.
[8] The Environment (Miscellaneous Amendments) (EU Exit) Regulations 2020 (legislation.gov.uk). Available at: https://www.legislation.gov.uk/uksi/2020/1313/contents/made
[9] The EU (Withdrawal Agreement) Act 2020 implements the European Union air quality limit values. The National Archives (TNA) (2020) 'European Union (Withdrawal Agreement) Act 2020' Available at: https://www.legislation.gov.uk/ukpga/2020/1/contents/enacted
[10] The Environmental Permitting (England and Wales) Regulations 2016. Available at: https://www.legislation.gov.uk/uksi/2016/1154/contents
[11] The Air Quality (England) Regulations 2000 (SI 2000/928), as amended. Available at: https://www.legislation.gov.uk/uksi/2000/928/contents/made
[12] The Environmental Targets (Fine Particulate Matter) (England) Regulations 2023. Available at: https://www.legislation.gov.uk/uksi/2023/96/contents/made
[13] The Non-Road Mobile Machinery (Type-Approval and Emission of Gaseous and Particulate Pollutants) Regulations 2018 (SI 2018.764) Available at: https://www.legislation.gov.uk/uksi/2018/764
[14] Department for Energy Security and Net Zero (2026) Overarching National Policy Statement for Energy (EN-1). Available at: https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1-2025
[15] Department for Energy Security and Net Zero (2026) National Policy Statement for Renewable Energy Infrastructure (EN-3). Available at: https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3-2025
[16] Department for Energy Security and Net Zero (2025) National Policy Statement for electricity networks infrastructure (EN-5) Available at: https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5-2025

- Department for Environment Food and Rural Affairs (Defra) Environmental Improvement Plan (EIP), December 2025[17];
- National Planning Policy Framework (NPPF) 2026[18];
- The Air Quality Strategy (AQS): framework for local authority delivery[19]
- The Clean Air Strategy 2019[20];
- South Warwickshire Local Plan (SWLP) 2026 (emerging policy)[21]
- South Worcestershire Development Plan (SWDP) 2026[22];
- Stratford-on-Avon District Council (SoADC) Core Strategy 2011-2031[23];
- Stratford-on-Avon Air Quality Strategy 2016 - 2031[24]; and
- Redditch Borough Council (ReBC) Local Plan No.4 2011-2030[25].

Guidance document

18.4.3 The air quality assessment has been undertaken with reference to the following guidance documents:

- Planning Practice Guidance (PPG) for Air Quality[26];
- Environmental Protection UK (EPUK), and Institute of Air Quality Management (IAQM) Land-Use Planning & Development Control: Planning for Air Quality[27];
- IAQM Guidance on the assessment of air quality impacts on designated nature conservation sites[28];
- IAQM Guidance on the Assessment of Dust from Demolition and Construction[29]; and
- Defra Local Air Quality Management Technical Guidance (LAQM.TG22)[30].

18.5 Method of assessment

18.5.1 The air quality assessment adopts the methodology published in IAQM guidance.

18.5.2 Evidence and assumptions relied upon in completing the assessment are provided within this section of the report.

Establishing the baseline

Study area

18.5.3 The air quality study area for each phase of the Scheme is described below. The Order Limits, with air quality constraints, is shown in Volume 2, Figure 18.1 Air quality constraints.

Study area – vehicle emissions in construction and decommissioning

18.5.4 The air quality study area for assessing the potential effects of vehicle emissions associated with Scheme construction and decommissioning comprises a 200 m buffer around routes where changes in traffic flows exceed assessment screening criteria. This is termed the Affected Road Network (ARN)[31].

[17] Department for Environment Food and Rural Affairs, (2025) Environmental Improvement Plan (EIP) 2025. Available at: https://www.gov.uk/government/publications/environmental-improvement-plan-2025/environmental-improvement-plan-eip-2025
[18] Ministry of Housing, Communities and Local Government (2026) National Planning Policy Framework (NPPF). Available at: https://www.gov.uk/guidance/national-planning-policy-framework
[19] Defra, (2023), Air quality strategy: framework for local authority delivery. Available at: https://www.gov.uk/government/publications/the-air-quality-strategy-for-england/air-quality-strategy-framework-for-local-authority-delivery
[20] Defra, (2019), Clean Air Strategy 2019. Available at: https://assets.publishing.service.gov.uk/media/5c3b9debe5274a70c19d905c/clean-air-strategy-2019.pdf
[21] South Warwickshire Local Plan (2026) (emerging plan). Available at: https://www.warwickdc.gov.uk/info/20376/planning_policy/1666/south_warwickshire_plan
[22] South Worcestershire Development Plan (2026) South Worcestershire Development Plan. Available at: https://www.worcester.gov.uk/planning/planning-policy/south-worcestershire-development-plan
[23] Stratford-on-Avon District Council (2016) Stratford-on-Avon District Core Strategy 2011- 2031. Available at: https://claverdon-pc.gov.uk/wp-content/uploads/2024/09/Stratford-Upon-Avon-Core-Strategy-2011-to-2031.pdf
[24] Stratford-on-Avon District Council (2026) Stratford-on-Avon District Council Air Quality Strategy 2026 – 2031. Available at: https://www.stratford.gov.uk/doc/214767/name/AQS%202026.pdf
[25] Redditch Borough Council (2017). Borough of Redditch Local Plan No. 4 (2011–2030). Available at: https://www.redditchbc.gov.uk/media/tbodcekr/adopted-borough-of-redditch-local-plan-no4-2011-2030.pdf
[26] Ministry of Housing, Communities and Local Government, Ministry of Housing, Communities & Local Government (2018 to 2021) and Department for Levelling Up, Housing and Communities, (2019), Planning Practice Guidance for Air Quality. Available at: https://www.gov.uk/guidance/air-quality--3
[27] IAQM, (2017), Land-Use Planning & Development Control: Planning for Air Quality. Available at: https://iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf
[28] IAQM (2020) A Guide to on the assessment of air quality impacts on designated nature conservation sites, v1.1. Available at: https://iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2020.pdf
[29] Institute of Air Quality Management (IAQM) (2024) Guidance on the Assessment of Dust from Demolition and Construction (Version 2.2). Available at: https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf
[30] Defra, (2025), Local Air Quality Management Technical Guidance (TG22). Available at: https://laqm.defra.gov.uk/wp-content/uploads/2021/03/LAQM-TG22-May-25-v2.1.pdf
[31] National Highways LA105 defines the Affected Road Network as all roads that trigger the traffic screening criteria and adjoining roads within 200 m.

18.5.5 The buffer zone is set at 200 m as concentrations of traffic derived pollutant emissions fall-off, i.e. decrease with increasing distance from the source (the road) due to dispersion. At a distance of 200 m from the road, the contribution from traffic emissions to total pollutant concentration is negligible, and concentrations having reduced to be equivalent to background concentrations[32].

Study area - operation

18.5.6 As for construction traffic, the study area for vehicle emissions for operational traffic is defined as a buffer zone of 200 m (as explained in paragraph 18.5.4) around routes used by operational traffic where the change in traffic flows due to operation of the Scheme exceeds assessment screening criteria.

18.5.7 There are no active combustion sources proposed as part of the Scheme.

18.5.8 The study area and assessment of operational emissions associated with a potential BESS fire are presented within the outline Battery Safety Management Plan (oBSMP).

Desk study

18.5.9 Information on existing baseline air quality conditions within the study area (presented at Section 18.6) was obtained from the following sources:

- Local authority local air quality management (LAQM) Air Quality Annual Status Reports[33, 34, 35]; and
- Department for Environment, Food and Rural Affairs (Defra) UK Air Information Resource[36].

18.5.10 Identification of receptors has been completed in accordance with IAQM Guidance[27, 28]. The following sources were used to identify receptors:

- Human receptors: Ordnance Survey OpenStreetMap base mapping in a GIS system and satellite imagery;
- Ecological receptors: Natural England datasets[37] viewed within a GIS system and Defra's Magic mapping website [38].

Survey

18.5.11 Project specific air quality monitoring surveys have not been undertaken. Defra background data and LAQM monitoring data demonstrates that ambient air quality is generally good, as would be expected in a rural environment in which the Scheme is located (see Section 18.6). Local authority and national monitoring programs are focussed on hotspot locations where pollutant concentrations are at risk of approaching or exceeding legislated objectives and relevant receptors are present. Furthermore, the Scheme will not introduce a permanent emissions source and any effect on ambient air quality due to short term and temporary construction traffic emissions.

Determining value

18.5.12 The Scheme has the potential to impact sensitive receptors where construction (and/or decommissioning) traffic introduces additional vehicle movements onto the local road network that may contribute to elevated pollutant concentrations.

18.5.13 Construction phase traffic flows[39] will be compared to IAQM Planning Guidance assessment screening criteria. The guidance indicates that an air quality assessment is required if traffic flows exceed the following screening criteria:

- A change of Light Duty Vehicles (LDV) of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA), or 500 AADT elsewhere.
- A change of Heavy Duty Vehicles (HDV)[40] of more than 25 AADT within or adjacent to an AQMA, or 100 AADT elsewhere.

18.5.14 Where Scheme generated construction traffic flows fall below the screening criteria, there will be negligible impact on local air quality and further assessment is not required.

18.5.15 Road links that exceed these screening criteria are termed the Affected Road Network (ARN), and further, proportionate, assessment is required where relevant receptors are present. The relevant planning authority will be consulted on the methodology (see 18.5.21), with a view to agreeing it with them.

[32] National Highways HA207/07, Figure C1. Available at: https://www.standardsforhighways.co.uk/search/df0c77ed-887b-4c84-be0e-000fe18545ae
[33] Redditch Borough Council (2025) Annual Air Quality Status Report, June 2025. Available at: https://worcsregservices.gov.uk/media/4pgeeg1e/rbc_asr_2025_combined.pdf
[34] Wychavon District Council (2025) Annual Air Quality Status Report, June 2025. Available at: https://www.worcsregservices.gov.uk/media/geplibx1/asr-wdc-final-v3-2026.pdf
[35] Stratford-On-Avon District C (2025) Annual Air Quality Status Report, July 2025. Available at: https://www.stratford.gov.uk/doc/214003/name/Stratford%20on%20Avon%20ASR%202025.pdf
[36] Defra Background Maps (2026) Available at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021
[37] Natural England (2026) Natural England Open Data Geoportal. Available at: https://naturalengland-defra.opendata.arcgis.com/
[38] Defra Magic Map (2026), Available at: https://magic.defra.gov.uk/
[39] It is anticipated that decommissioning traffic flows will generate impacts no worse than those of construction.
[40] Heavy Duty Vehicles encompasses goods vehicles (trucks) and passenger transport vehicles (buses and coaches) of more than 3.5 tonnes.

18.5.16 Impacts may occur where sensitive receptors are present within 200 m of the ARN. If there are no receptors within 200 m of the ARN, there will be no impact and further assessment is not required.

18.5.17 IAQM methodology[27, 28] defines sensitive receptors as:

- Human receptors may include locations such as residential properties, locations of susceptible populations (e.g. schools, hospitals, care homes for the elderly), or any other location where a member of the public may be exposed to an air pollutant for the relevant regulated time period.
- Ecological receptors may include statutory designated sites such as Sites of Special Scientific Interest (SSSI), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, and local nature reserves (LNR), and habitats with non-statutory designations including local wildlife sites (LWS), nature improvement areas (NIA) and ancient woodland (AW).

18.5.18 The criteria used to determine the sensitivity of receptors to local air pollutants are presented in Table 18-2.

18.5.19 Pollutant concentrations will be estimated at sensitive human health receptors defined according to Defra TG22 guidance[30] as:

"A location representative of human exposure to a pollutant, over a time period relevant to the objective that is being assessed against".

Table 18-2 IAQM criteria for determining sensitivity of air quality receptors

Receptor sensitivity	**Human health receptors sensitive to local air pollutants**	Ecological receptors **sensitive to local air pollutants**
High	▪ Residential buildings; ▪ Schools and education premises; ▪ Hospitals, clinics, care homes; and ▪ any other location where a member of the public may be exposed to an air pollutant for the relevant regulated time period ▪	International, European, or nationally designated nature conservation sites with designated features known to contain species sensitive to air quality (i.e., may cause a loss of habitats or reduce species presence in a direct or indirect way).
Medium	▪ Cafes / bars with external areas, sports facilities and camp sites, hotels, gardens, parks, places of worship, community centres, libraries.	Nationally designated ecological sites with species sensitive to air pollution.
Low	▪ Offices, shops / high streets; and ▪ Public rights of way (PRoW).	Locally designated ecological site with species sensitive to air pollution.

18.5.20 Receptors, representative of the worst-case locations within the study area (i.e. those likely to experience the greatest changes in pollutant concentrations) have been identified in accordance with IAQM guidance.

Impact assessment

Determining impact magnitude

Traffic emissions

18.5.21 If, changes in traffic flows due to construction traffic exceed screening criteria and relevant receptors are identified, further assessment may be required. The approach to be adopted will be proportionate. It may comprise high level emissions calculations using the National Highways DMRB tool, or potentially more detailed estimation of pollutant concentrations using the dispersion model, ADMS Roads (v5.1.0.2)[41] . Emissions modelling would be undertaken at selected sensitive receptors on those road links that exceed the screening criteria, the ARN. The assessment considers a 'without Scheme construction traffic scenario' (Do Minimum) and a 'with Scheme construction traffic scenario' (Do Something). The assessment considers the contribution from the additional construction traffic flows on concentrations of the pollutants nitrogen dioxide (NO_2), and particulate matter (PM_{10} and $PM_{2.5}$). Pollutants are described further at Section 18.6 and Volume 2, Appendix 18.1 Legislation and policy relevant to the air quality assessment.

[41] ADMS Roads is industry recognised- air quality modelling software for assessing road traffic emissions. It is published by Cambridge Environmental Research Consultants (CERC).

18.5.22 Decommissioning traffic is anticipated to use the same routes as construction traffic with flows no higher than those in the construction phase. Thus they may be considered qualitatively with reference to any quantitative results from assessment of construction traffic emissions.

18.5.23 If operational traffic flows exceed screening criteria, the same approach to assessment will be adopted.

18.5.24 A matrix for describing the impact of a change in pollutant concentration at individual receptors is set out in the EPUK and IAQM Planning Guidance[20], reproduced in Table 18-3. These descriptors are used in the assessment of changes to annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ at discrete modelled receptor locations due to traffic emissions associated with various phases of the Scheme, and range from negligible to slight, moderate or substantial.

18.5.25 The impact description depends upon:

- The larger value of the total concentration without the Scheme or with the Scheme, as a percentage of the relevant Air Quality Assessment Level (AQAL i.e. AQS objective); and
- The change in concentration, classified according to the percentage change relative to the AQAL of interest. The change is calculated based on concentrations rounded to one decimal place. The percentage change is then rounded up or down to the nearest whole number before the application of the impact descriptor.

Table 18-3 IAQM Air quality impact descriptors for individual receptors

Long term average concentration at receptor	Percentage change in concentration relative to AQAL			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Exhaust emissions from NRMM – construction and decommissioning

18.5.26 Non-Road Mobile Machinery (NRMM) could be used throughout the Order Limits and may contribute to emissions of NO_2, PM_{10} and $PM_{2.5}$. NRMM used should be compliant with appropriate standards as set in NRMM regulations[13].

18.5.27 The main activities during which NRMM would be used are as follows:

- Construction of the BESS, Inverters, and Transformers;
- Construction of Solar PV Panels which would likely include the use of push press piling rigs and excavators;
- Construction of the National Grid Substation and Project Substations;
- Trenching and installation of the Grid Connection Cables and Interconnecting Cables, which would include the use of both aboveground means (i.e. excavators and dozers) and trenchless techniques such as Horizontal Directional Drilling (HDD), if required.

18.5.28 At the time of writing, there is limited detail on type and number of construction plant, and location of where plant will be operating in relation to receptor locations. NRMM emissions will be temporary and are unlikely to make a material contribution to pollutant concentrations at sensitive receptors. The extent to which these can affect local air quality is dependent on multiple factors[30], including:

- Duration and phasing of works;
- Type and number of plant / NRMM;
- Operating hours of NRMM;
- Emissions standards to which NRMM comply;
- Proximity of receptors to NRMM working areas; and
- Existing background pollutant concentrations.

18.5.29 Defra's Technical Guidance LAQM (TG22)[30] indicates that with suitable controls and site management, NRMM emissions are unlikely to make a significant impact on local air quality.

18.5.30 Where construction activities and use of NRMM are to be concentrated spatially or temporally within 200m of sensitive human or ecological receptors, a proportionate, qualitative appraisal of potential NRMM emissions in construction will be presented in the ES.

Determining effect significance

18.5.31 The IAQM methodology[20] describes the effect of air quality impacts as either significant or not significant determined through application of professional judgement of a suitably qualified air quality practitioner. This judgement must take into account such factors as:

- The existing and future air quality in the absence of the Scheme;
- The extent of current and future population exposure to the impacts (i.e. extrapolating the findings from the individual modelled receptors); and
- The influence and validity of any assumptions adopted when modelling the impacts.

18.5.32 Additional factors to be considered include:

- Number, location and sensitivity of receptors;

- Duration, permanence (permanent or temporary) and magnitude of impact;
- Impact relative to legislated air quality objectives; and
- Effectiveness of measures to mitigate- any adverse effects.

18.5.33 Justification of where professional judgement has been applied will be presented in the ES.

18.6 Baseline conditions

Pollutants

18.6.1 The air quality assessment considers the pollutants NO_2, PM_{10} and $PM_{2.5}$ because these pollutants are most likely to be near to legislated air quality objectives in urban areas.

18.6.2 Exposure to high concentrations of NO_2 can irritate the airways and adversely affect the respiratory system.

18.6.3 Particulate Matter, particularly fine particles ($PM_{2.5}$), can penetrate deep into the lungs and bloodstream, contributing to respiratory and cardiovascular diseases and increasing the risk of premature mortality.

18.6.4 Relevant pollutants, their sources and effects and statutory criteria are further described in Volume 3, Appendix 18.1 Legislation, policy and guidance relevant to air quality.

Local Air Quality Management

18.6.5 Air quality monitoring is undertaken by national and local authorities and is a key component of local air quality management. Measurement of pollutant concentrations include those made by analytical instruments that measure continuously, and passive sampling devices such as diffusion tubes.

18.6.6 Redditch Borough Council (ReBC), Wychavon District Council (WyDC) and Stratford-on-Avon District Council (SoADC) each operate a network of diffusion tubes across their local authority areas to measure concentrations of Nitrogen dioxide (NO_2). No monitoring locations are considered local to the Scheme, with the closest located more than 4 km to the southwest of the Order Limits, within Evesham. There are no local or national continuous monitoring stations operating within the study area, with the nearest being operated by WyDC and located in Wychbold approximately 10 km northwest of the Scheme.

18.6.7 The local authorities undertake supplementary monitoring (for NO_2, PM_{10}, $PM_{2.5}$) using Low- Cost Sensors, but none are located within the study area. The nearest sensor is located approximately 3 km southwest of the Order Limits in Evesham (WyDC).

Air Quality Management Areas

18.6.8 The Order Limits are within the local authority areas of ReBC, WyDC and SoADC, none of which have active AQMA declarations.

Defra mapped background concentrations

18.6.9 Estimates of current and future year background pollutant concentrations in the UK are available on the Defra UK-Air website[42]. The background estimates, which are a combination of measured and modelled data, are available for each 1 km grid square throughout the UK for a reference year of 2021 which is the basis for future year estimates up to 2040. The average background concentrations for the current year (2026) for NO_2, PM_{10} and $PM_{2.5}$ for the grid squares covering the Order Limits are presented in Table 18-4.

18.6.10 The data indicate that all modelled backgrounds are below the relevant AQS objectives.

Table 18-4 Defra Mapped Background NO_2, PM_{10} and $PM_{2.5}$ Concentrations, ($\mu g/m^3$)

Year		NO_2	PM_{10}	$PM_{2.5}$
2026 Baseline	Average	4.0	11.2	6.1
	Minimum	3.7	10.2	5.9
	Maximum	5.3	12.7	7.5
2029 Construction	Average	3.6	10.9	5.9
	Minimum	3.4	9.9	5.7
	Maximum	5.0	12.5	7.3
2031 Opening year	Average	3.4	10.8	5.8
	Minimum	3.2	9.8	5.5
	Maximum	4.7	12.3	7.2

[42] Defra, (2021) Background mapping data for local authorities. Available at: https://uk air.defra.gov.uk/data/laqm-background-maps?year=2021

Sensitive receptors

18.6.11 At the time of writing, indicative construction routes are not routed through AQMAs, as shown in Volume 2, Figure 12.5 Indicative construction access routes. Furthermore, suitable data (assignment of construction traffic flows to individual roads links) for determining an affected road network (ARN - those road links that exceed screening criteria) are not available. When suitable data are available, sensitive human health and ecological receptors within 200 m of the ARN for construction traffic will be considered in the air quality assessment. Potential receptor locations in proximity to the Scheme are described below.

Human health receptors

18.6.12 The Scheme is located close to the A46, A422, B4088 and B4085. Sensitive human health receptors within 1 km of the Order Limits include residential properties and schools. The closest residential receptors to the Scheme are a number of individual residential properties adjacent to sub-Sites 1(b), 1(c), 1(d), 3(a) and 4. Additionally, larger groups of residential properties are located on:

- Millers Bank, approximately 60 m east of sub-Site 2(b);
- King's Lane, approximately 100 m east of sub-Site 2(e); and
- Shinehill Lane, approximately 150 m north of Site 4.

18.6.13 Cleeve Priory Church of England Primary School is also located approximately 250 m southwest of sub-Site 3(b). Bidford Gliding and Flying Club which includes a campsite area for members, is located adjacent to, and between sub-Sites 3(b) and 3(c).

Ecological receptors

18.6.14 No ecological Internationally designated ecological sites have been identified in the wider vicinity of the Scheme.

18.6.15 Wylde Moor, Feckenham SSSI is located at the northern end of the CRC, located over 50 m from the Order Limits. Rookery Cottage Meadow SSSI lies immediately south of the B4090 and Windmill Hill SSSI lies immediately east of the B4510. If construction traffic exceed screening criteria on these routes, the effects on these ecological designations will be assessed.

18.6.16 Broom Railway Cutting SSSI, located ~110 m east of sub-Site 2(e) is designated for its geological features.

18.6.17 There are several Local wildlife sites (LWS) in proximity to the Scheme:

- The Ling Ground and Weethley Wood LWS and Bush Wood LWS are located adjacent to sub-Sites 1(e) and 1(b);
- Grassland near Bevington Waste LWS is located adjacent to sub-Sites 1(c) and 1(d);
- Dunnington Court Plum Orchard LWS lies within sub-Site 2(a);
- Ragley Park Woods LWS is located approximately 10 m north of the sub-Site 2(a);
- Alcester - Broom Disused Railway LWS crosses sub-Sites 2(b) and 2(e);
- Broom Old Quarry LWS, Meadow near Broom LWS and Road verge LWS are located adjacent to sub-Site 2(e);
- Fields South of Wixford LWS is adjacent to sub-Site 2(b);
- River Arrow LWS crosses sub-Sites 1(e), 1(c) and is adjacent to sub-Sites 1(d), 2(c), 2(d), 2(b) and 2(e).

18.6.18 Several areas of Ancient Woodland have been identified within and adjacent to the Order Limits. There are two instances of Ancient Woodland lying within the Order Limits within the cable route, Hanging Wood, located north west of Holberrow Green within CRC1 and Marl Cliff by the River Avon, west of Marlcliff.

18.6.19 In relation to the Sites, the closest Ancient Woodland is Bush Wood, lying north and south of Alcester Road, immediately adjacent to sub-Sites 1(c) and 1(e). In addition, Weethley Wood is immediately adjacent to sub-Site 1(e), Williams Wood is immediately adjacent to sub-Sites 1(b) and 1(c), Commissioners Wood is immediately adjacent to sub-Site 1(a) and Ennister Wood is immediately adjacent to sub-Site 2(a).

Embedded mitigation

18.6.20 The development of the air quality assessment for the Scheme has taken into consideration the embedded mitigation as defined in Volume 1, Chapter 2, Scheme description, Section 2.7 of this ES and design evolution outlined in Volume 1, Chapter 4 Consideration of alternatives of this ES. For air quality this includes:

- E-GEN.1 - Implementation of Outline Construction Environmental Plan (oCEMP);
- E-GEN.3 - Implementation of Outline Operational Environmental Management Plan (oOEMP);
- E-GEN.4 - Implementation of Outline Decommissioning Environmental Management Plan (oDEMP);
- E-LV.5 - Aligning cable route away from sensitive features
- E-B.4 - Buffer zones between sensitive environmental features and the developable area

Arrow Valley Solar