

Green Hill Solar Farm Preliminary Environmental Information Report

Chapter 16 Air Quality

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16 Air Quality

16.1 Introduction

16.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the findings of the Environmental Impact Assessment (EIA) undertaken to date concerning the potential impacts of the Scheme on air quality during the construction, operation and maintenance, and decommissioning phases. The following aspects are considered within the air quality assessment process:

- Air quality effects of dust generated during construction and decommissioning phases;
- Air quality effects of vehicle emissions during the construction, operation and maintenance, and decommissioning phases;
- Air quality effects of emissions from Non-Road Mobile Machinery (NRMM) (onsite plant) during the construction and decommissioning phases; and
- Air quality effects of emissions generated in the event of a Battery Energy Storage System (BESS) fire during the operational phase.

16.1.2 For more details about the Scheme, refer to **Chapter 4: Scheme Description** of this PEIR.

Appendices and Figures

16.1.3 This chapter is supported by the following appendix in PEIR **Volume 3**:

- **Appendix 16.1:** Construction Dust Methodology and Assessment.

16.1.4 This chapter is supported by the following figures in **PEIR Volume 2**:

- **Figure 16.1:** Construction Dust Assessment Study Area.

16.1.5 This chapter is accompanied by the following Figure within Section 16.6:

- **Figure 16.2:** Local Air Quality Monitoring Locations and AQMAS.

16.1.6 This chapter is supported by the following tables:

- **Table 16.1:** Summary of Consultation and Responses;
- **Table 16.2:** Air Quality Strategy (AQS) Objectives;
- **Table 16.3:** Examples of Locations Where AQS Objectives Apply;
- **Table 16.4:** IAQM Impact Descriptors for Individual Receptors;
- **Table 16.5:** 2018 - 2022 Annual Mean NO₂ Concentrations within 5km of the Site and Cable Route Search Area Boundary;
- **Table 16.6:** Maximum 2024 Background Concentrations across the Green Hill Sites; and
- **Table 16.7:** Ecological Designated Sites located within 50m of the Scheme Boundary.

16.2 Consultation

16.2.1 An EIA Scoping Report was submitted to the Planning Inspectorate (PINS) in July 2024, with a formal request for a Scoping Opinion. PINS subsequently issued the Scoping Opinion on the proposed scope of the environmental assessment on 30th August 2024. Consultation undertaken throughout the pre-application and scoping phase for the Scheme has informed the approach to the air quality assessment and the information provided within this chapter.

16.2.2 A summary of consultation and response to the Scoping Report are outlined below in **Table 16.1**.



Table 16.1: Summary of Consultation and Responses

Consultee and Date	Response	Outcome and any further steps anticipated
North Northamptonshire Council, 28 May 2024	Confirmation of agreement with scope and methodology for air quality assessment associated with PEIR and ES.	No specific comment to be addressed as North Northamptonshire Council agrees with the approach in both the PEIR and forthcoming ES.
West Northamptonshire Council, 16 July 2024	Confirmation of agreement with scope and methodology for air quality assessment associated with PEIR and ES. West Northamptonshire Council has requested to review any intended scoped out elements (e.g. operational traffic) once more information is available.	No specific comment to be addressed as West Northamptonshire Council agrees with the approach in the PEIR and forthcoming ES. The detailed information requested will be shared with West Northamptonshire Council once it becomes available as part of the ES.
The Planning Inspectorate, 30 August 2024	3.12.1, Operational vehicle assessment: <i>“The SR states that traffic trips during operation are to be below the criteria for assessment as set out in the Institute of Air Quality Management (IAQM) criteria and therefore should be scoped out of the assessment.</i> <i>The Inspectorate, considering the nature and scope of the Proposed Development, agrees to this approach subject to confirmation in the ES that the proposed construction and operational vehicle numbers alone or cumulatively with other proposals on relevant links will not exceed the relevant IAQM thresholds”.</i>	The traffic impacts of construction and operation will be screened against IAQM criteria in the ES, and the potential for air quality effects to occur from traffic has been reviewed in this chapter based on the traffic information available at this stage of the project and the IAQM criteria required to trigger assessment (see Section 16.8).
	3.122, Location of receptors: <i>“The ES should be accompanied by an appropriate plan illustrating the location of sensitive air quality receptors within the vicinity of the Proposed Development to aid understanding of the extent of effects”</i>	A figure showing all sensitive receptors considered in the air quality assessment will be provided in the ES. Figure 16.1 Construction Dust Assessment Study Area associated with this chapter, shows the area over which construction dust effects could occur at sensitive receptors.
	3.1.23, Decommissioning: <i>“The SR states that the decommissioning phase will be assessed using the same approach as for the construction phase, however it has not been included within the summary of matters to be scoped into the ES. For the avoidance of doubt, the Inspectorate considers that</i>	The decommissioning phase will be assessed using the same approach as adopted for the construction phase in the ES. Details regarding decommissioning phase activities are limited for the PEIR, however the potential effects on air quality associated with the decommissioning phase



Consultee and Date	Response	Outcome and any further steps anticipated
	<i>the proposed approach is acceptable, and an assessment of decommissioning impacts should be scoped into the ES”.</i>	are considered to be similar to those risks identified during the construction phase and are described in Section 16.8. As such, the assessment undertaken for construction dust in this chapter is also considered applicable in relation to decommissioning.

16.3 Legislation, Planning Policy and Guidance

16.3.1 This section provides an overview of the legislation, planning policy and guidance against which the Scheme will be considered for air quality.

Legislation

UK Legislation

The Air Quality Standards Regulations 2010 (as amended) (Ref.1)

16.3.2 These regulations implement EU Directive (2008/50/EC) on ambient air quality and cleaner air for Europe (Ref.2) and remain in force in domestic law following UK’s withdrawal from the EU as ‘retained EU law’. EU Directive 2008/50/EC on ambient air quality and cleaner air for Europe set legally binding limits for concentrations of specific air pollutants. It merged, consolidated and replaced the majority of previous EU air quality legislation, and incorporated the Fourth Daughter Directive.

The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019 (Ref.3)

16.3.3 These regulations made amendments to the Air Quality Standards Regulations 2010 to reflect the UK’s departure from the EU.

The Air Quality (England) Regulations 2000 (Ref.4) and the Air Quality (England) (Amendment) Regulations 2002 (Ref.5)

16.3.4 The regulations set national air quality objective levels for local authorities to meet in England. The Air Quality Strategy (AQS) objectives for pollutants considered within this assessment are shown in **Table 16.2**.

Table 16.2: Air Quality Strategy (AQS) Objectives

Pollutant	AQS Objective Concentration (µg/m ³)	Averaging Period
Nitrogen Dioxide (NO ₂)	40	Annual mean
	200	1-hour mean; not to be exceeded more than 18 times a year
Particulate Matter less than 10 microns in diameter (PM ₁₀)	40	Annual mean
	50	24-hour mean; not to be exceeded more than 35 times a year
Particulate Matter less than 2.5 microns in diameter (PM _{2.5})	20*	Annual mean

* It should be noted that the PM_{2.5} objective is a target value and is not in the 2010 regulations as a legal requirement to be achieved by local authorities.



Environment Act 2021 (Ref.6)

16.3.5 The Environment Act 2021 has two main functions:

- To give a legal framework for environmental governance in the UK; and
- To bring in measures for the improvement of the environment in relation to waste, resource efficiency, air quality, water, nature and biodiversity, and conservation.

16.3.6 The majority of the Act does not make any immediate changes for organisations other than regulators. Legislative requirements relevant to air quality include the requirement for the Secretary of State to set targets for PM_{2.5}. The Environmental Targets (Fine Particulate Matter) England Regulations 2023 (Ref.7) sets out the following targets for PM_{2.5}:

- Annual Mean Concentration Target ('concentration target') – a target of 10 micrograms per cubic metre (µg/m³) to be met across England by 2040.
- Population Exposure Reduction Target ('exposure reduction target') – a 35% reduction in population exposure by 2040 (compared to a base year of 2018).

16.3.7 There is currently no advice from Defra on how these targets will be assessed in the planning system, however given the nature of the Scheme, it is unlikely to affect these targets.

Part IV of the Environment Act (1995) (Ref.8)

16.3.8 The Environment Act 1995 contains provisions for protecting air quality in the UK and for local air quality management. It requires the UK Government to produce a national AQS, which contains standards, objectives and measures for improving ambient air quality, and defines Local Air Quality Management (LAQM). It introduced an obligation on local authorities to issue, where the air quality standards are not being met, an order designating an Air Quality Management Area (AQMA).

Environmental Protection Act 1990 (Ref.9).

16.3.9 Part III of the Environmental Protection Act 1990 provides legislation around statutory nuisance, which applies to dust.

The Infrastructure Planning (Environmental Impact Assessment (EIA)) Regulations 2017 (Ref.10)

16.3.10 These regulations require major accidents or disasters to be considered within a planning application. The regulations require that potential risks, impacts and consequences on the environment of such an incident to be considered. The regulations also require measures are identified and proposed to mitigate the impacts of a major accident or disaster.

Planning Policy

National Planning Policy

National Policy Statement (NPS) for Energy (EN-1) (Ref.11)

16.3.11 The overarching NPS for Energy (EN-1) was designated in January 2024. The policy sets out the overarching national energy policy for delivering major energy infrastructure.

16.3.12 The following paragraphs in EN-1 are relevant to air quality and the Scheme:

- '5.2.8 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 [Environmental Statement]';
- '5.2.9 The ES should describe:
 - Existing air quality concentrations and the relative change in air quality from existing levels; and



- *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.'*
 - *'5.2.10 In addition, applicants should consider the Environment Targets (Fine Particulate Matter) (England) Regulations 2022 and associated Defra guidance.'*
 - *'5.2.11 Defra publishes future national projections of air quality based on estimates of future levels of emissions, traffic, and vehicle fleet. Projections are updated as the evidence base changes and the applicant should ensure these are current at the point of an application. The applicant's assessment should be consistent with this but may include more detailed modelling and evaluation to demonstrate local and national impacts. If an applicant believes they have robust additional supporting evidence, to the extent they could affect the conclusions of the assessment, they should include this in their representations to the Examining Authority along with the source.'*
 - *'5.2.12 Where a proposed development is likely to lead to a breach of any relevant statutory air quality limits, objectives or targets, or affect the ability of a noncompliant area to achieve compliance within the timescales set out in the most recent relevant air quality plan/strategy at the time of the decision, the applicant should work with the relevant authorities to secure appropriate mitigation measures to ensure that those statutory limits, objectives or targets are not breached.'*
 - *'5.2.13 The Secretary of State should consider whether mitigation measures are needed both for operational and construction emissions over and above any which may form part of the project application. A construction management plan may help codify mitigation at this stage. In doing so the Secretary of State should have regard to the Air Quality Strategy in England, or the Clean Air Plan for Wales in Wales, or any successors to these and should consider relevant advice within Local Air Quality Management guidance and PM_{2.5} targets guidance'.*
- 16.3.13 EN-1 states that mitigations identified in Section 5.14 on traffic and transport impacts will help mitigate the effects of air emissions from transport (see EN-1 paragraph 5.2.16). The mitigations include for example, identifying opportunities to reduce the need to travel by consolidating trips, retime travel outside of the known peak times and reroute to use parts of the network that are less busy (see EN-1 paragraph 5.2.14).
- 16.3.14 EN-1 states that air quality considerations should be given substantial weight where a project would lead to a deterioration in air quality in an area or lead to a new area where air quality breaches any national air quality limits (see EN-1 paragraph 5.2.16).
- 16.3.15 Where substantial changes in air quality levels are expected, even if this does not lead to any breaches of national air quality limits, air quality considerations will also be important. Any relevant statutory air quality limits must be taken account of in all cases. Additionally, where a project is likely to lead to a break of such limits, appropriate mitigation measures should be secured (paragraphs 5.2.7 and 5.2.12). Paragraph 5.2.19 states that if a project will lead to non-compliance with a statutory limit, objective or target the Secretary of State should refuse consent.
- 16.3.16 EN1 also states that air quality considerations should be given substantial weight where a project is proposed near a sensitive receptor site, such as an education or healthcare facility, residential use or a sensitive or protected habitat, and if the applicant cannot provide justification for this location, and a suitable mitigation plan, the Secretary of State should refuse consent (paragraphs 5.2.17 and 5.2.18).



NPS on Renewable Energy Infrastructure (EN-3) (Ref.12)

- 16.3.17 NPS EN-3, designated in January 2024, applies to solar developments and is therefore relevant to the Scheme. EN-3 does not reference any specific requirements regarding air quality in respect of solar developments.

NPS for Electricity Networks Infrastructure (EN-5) (Ref.13)

- 16.3.18 NPS EN-5, designated in January 2024, principally covers above-ground electricity lines of 132kV and above. EN-5 does not specifically reference requirements regarding air quality.

National Planning Policy Framework (Ref.14)

- 16.3.19 The revised National Planning Policy Framework (NPPF) published in December 2023 sets out the Government's planning policies for England and how these are expected to be applied. Paragraph 192 considers impacts of developments on air quality:

- *'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.'*

Planning Practice Guidance (Ref.15)

- 16.3.20 The Planning Practice Guidance provides a summary of the further guidance on air quality issues set out in the NPPF. The practice guidance sets out how planning can take account of the impact of new development on air quality.

- 16.3.21 The guidance notes that the extent to which air quality is relevant to a planning decision will depend on the proposed development and its location. The guidance states: 'Where air quality is a relevant consideration the local planning authority may need to establish:

- The 'baseline' local air quality, including what would happen to air quality in the absence of the development;
- Whether the proposed development could significantly change air quality during the construction and operational phases (and the consequences of this for public health and biodiversity); and
- Whether occupiers or users of the development could experience poor living conditions or health due to poor air quality'

Local Planning Policy

North Northamptonshire Joint Core Strategy 2011-2031 (Ref.16)

- 16.3.22 In the North Northamptonshire Joint Core Strategy 2011 – 2031, adopted June 2016, the following strategic policies relate to air quality and are therefore potentially relevant to the Scheme:

- Policy 4 – Biodiversity and Geodiversity – 'A net gain in biodiversity will be sought and features of geological interest will be protected and enhanced through: ... a) iii. Protecting the natural environment from adverse effects from noise, air and light pollution...'; and
- Policy 8 – North Northamptonshire Place Shaping Principles – 'Development Should: e) Ensure quality of life and safer and healthier communities by: ... ii. Preventing both new and existing development from contributing to or being adversely affected by unacceptable levels of soil, air, light, water or noise pollution or land instability...'

West Northamptonshire Local Plan – 2041 Ref.17

16.3.23 West Northamptonshire Local Plan 2041 is being prepared and a draft version is currently going through consultation. The Local Plan includes the following policy with regards to air quality which is relevant to the Scheme:

- Policy PL2 – Air Quality:
 - *‘A. All development is required to take steps to mitigate its impact on local air quality in the construction and post development phases...’*
 - *‘D. Consideration shall be given to reducing construction/demolition dust, reducing transport and plant emissions both in the operational and development phase, low emission travel and using low emission heating and cooling systems.’*

West Northamptonshire Joint Core Strategy Local Plan Part 1 (Ref.18)

16.3.24 In the West Northamptonshire Joint Core Strategy Local Plan (Part 1) 2011 – 2029, the following strategic policies relate to air quality and are therefore relevant to the Scheme:

- Policy S10 – Sustainable Development Principles – ‘Development will: ... k) Minimise pollution from noise, air and run off.’; and
- Policy BN9 – Planning for Pollution Control – ‘Proposals for new development which are likely to cause pollution or likely to result in exposure to sources of pollution or risks to safety will need to demonstrate that they provide opportunities to minimise and where possible reduce pollution issues that are a barrier to achieving sustainable development and healthy communities including: ... a) Maintaining and improving air quality, particularly in poor air quality areas, in accordance with national air quality standards and best practice ...’.

Northampton Local Plan Part 2 (Ref.19)

16.3.25 In the Northampton Local Plan Part 2 2011 – 2029, the following strategic policies relate to air quality and are therefore relevant to the Scheme:

- Policy Q3 - Carbon reduction, community energy networks, sustainable design and construction, and water use – *‘A: Applications for major development, including redevelopment of existing floorspace, must include a Sustainability Statement submitted with their planning application, setting out their approach to the following issues: ... vi. How the proposals meet all other policies in this plan that relate to sustainability including: ... b. Land, water noise and air pollution ...’*
- Policy Q4 – Health and wellbeing – *‘A: The health and wellbeing of communities will be maintained and improved by requiring major development to demonstrate, through an appropriate health impact assessment, that it will contribute to creating an age friendly, healthy and equitable living environment through: ... iii. Preventing negative impacts on residential amenity and wider public safety from noise, ground instability, ground and water contamination, vibration and air quality ...’*
- Policy MO3 – Transport schemes and mitigation – *‘D: Transport schemes which provide an element of environmental protection will be prioritised. In some cases, it may be necessary to have regard to mitigation measures in line with table 10 of the Northampton Low Emission Strategy 2017 (or the appropriate part of a successor document) namely: i. Implementation and operation of Clean Air Zones (CAZ) or Low Emission Zone...’*

Milton Keynes City Plan 2050 (Ref.20)

The draft Milton Keynes City Plan 2050 is currently going through consultation and Policy CEAT7 ‘Mitigating wider environmental pollution’ is of relevance to air quality and the Scheme. This policy states:

- *‘D. Impacts upon air quality arising from airborne emissions, dust and odour will be considered when determining planning applications. Proposals that would result in*



unacceptable impacts to human health and/or the natural environment through air pollution or would prejudice compliance with national air quality objectives, will be refused.'

- *'E. Major development proposals will be required to demonstrate how prevailing air quality and potential impacts upon air quality have been considered, and how air quality will be kept to an acceptable standard through avoidance and mitigation. Minor development proposals will also be required to demonstrate this if any of the following apply:*
 - *The development is likely, due to the nature of the proposal, and through in-combination effects, to give rise to significant air pollution;*
 - *The site is within an Air Quality Management Area;*
 - *The site is within 50 metres of a major road or heavily trafficked route, including the A4146, A421, A422, A428, A5, A509, A5130, and M1;*
 - *The site is within proximity to a source of air pollution which could present a significant risk to human health; or*
 - *The type of development would mean its occupiers would be particularly sensitive to air pollution, such as schools, health care establishments or housing for older people, children's care, or adult social care'.*

Milton Keynes Local Plan (Ref.20)

16.3.26 In the Milton Keynes Local Plan: MK 2016 - 2031 the following strategic policies relate to air quality and are therefore relevant to the Scheme:

- Policy EH7 - Promoting Healthy Communities - 'Milton Keynes Council is committed to reducing health inequalities, increasing life expectancy and improving quality of life of the Borough. Proposals should be designed to achieve the aspirations below: ... 5. Seeking to improve air quality and reduce noise by locating and designing pollution generating land uses and roads to avoid adverse impacts on sensitive land uses, and securing necessary mitigation measures to make development acceptable'.
- Policy NE6 - Environmental Pollution, Air Quality:
 - *'D. Prevailing air quality and potential impacts upon air quality arising from airborne emissions, dust and odour associated with the construction and operation of a proposal (including vehicular traffic) will be considered when determining planning applications. Proposals that would result in or be subject to unacceptable risk to human health and the natural environment from air pollution, or would prejudice compliance with national air quality objectives, will be refused.'*
 - *'E. An Air Quality Assessment that demonstrates how prevailing air quality and potential Impacts upon air quality have been considered, and how air quality will be kept to an acceptable standard through avoidance and mitigation, will be required for major and minor development proposals if any of the following apply:*
 1. *The development is likely, due to the nature of the proposal, and through in-combination effects, to give rise to significant air pollution;*
 2. *The site is within an Air Quality Management Area;*
 3. *The site is within 50 metres of a major road or heavily trafficked route;*
 4. *The site is within proximity to a source of air pollution which could present a significant risk to human health; and/or*
 5. *The type of development would mean its occupiers would be particularly sensitive to air pollution, such as schools, health care establishments or housing for older people.'*
 - *'F. The potential impact of proposals upon odour levels, or their sensitivity to prevailing sources and levels of odour, should be considered and addressed. Where*



appropriate, the Council will require an Odour Impact Assessment to be provided, including an Odour Management Plan where necessary'.

- Policy SC1 - Sustainable Construction - '*... D. Prioritise the use of materials and construction techniques that have smaller ecological and carbon footprints, help to sustain or create good air quality, and improve resilience to a changing climate where appropriate.*'

Guidance

Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (Ref.22)

- 16.3.27 This guidance contains advice on how to classify the risk of dust impacts arising from construction activities such as earthworks and demolition, and outlines mitigation measures which would be appropriate for each activity according to the risk category.

IAQM and Environmental Protection UK (EPUK) Land-use Planning and Development Control: Planning for Air Quality (Ref.23)

- 16.3.28 This guidance provides advice on how air quality should be considered in the land-use planning and development control process. The guidance includes best practice advice on the approach to air quality assessments for development.

Department for Environment Food & Rural Affairs (DEFRA) PM_{2.5} Targets: Interim Planning Guidance (Ref.24)

- 16.3.29 This interim planning guidance has been developed to allow consideration of the Environment Targets (Fine Particulate Matter) (England) Regulations 2022 when making planning applications and planning decisions.

DEFRA Local Air Quality Management Technical Guidance (TG22) (Ref.25)

- 16.3.30 This guidance is designed to support local authorities in carrying out their LAQM duties under the Environment Act 1995 as amended by the Environment Act 2021. LAQM is the statutory process by which local authorities monitor, assess and take action to improve local air quality. The technical guidance is also used frequently to support air quality assessments for development.

East Midlands Air Quality Network Air Quality and Emissions Mitigation Guidance for Developers (Ref.26)

- 16.3.31 This guidance is applicable to development in North and West Northamptonshire and aims to improve air quality. The document provides advice to be considered by developers in advance of applying for planning permission, to consider and mitigate the impacts of their development on air quality.

National Highways Design Manual for Roads and Bridges (DMRB) LA105 (Ref.27)

- 16.3.32 This guidance is used for National Highways' schemes and provides advice on the assessment of vehicle emissions.

16.4 Assessment Methodology

- 16.4.1 The methodologies described in the following section have been developed in line with the relevant planning policy and appropriate industry guidance for assessing potential effects from the Scheme on air quality.

Study Area

Construction Dust Emissions

- 16.4.2 As the Scheme's Order limits are not yet finalised, for PEIR, the boundaries of the Sites (Green Hill A to G and BESS Site) and the Cable Route Search Area together are used to define the extents of the Scheme (the Scheme's boundary). In accordance with the IAQM construction dust guidance (Ref.22), the Study Area for construction phase dust is:



- 250m from the Scheme Boundary for human receptors (based on the worst-case assumption that construction activities would occur at the Scheme boundary) and up to 50m for ecological receptors; and
- 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrances.

16.4.3 The construction dust study area is presented in **Volume 2, Figure 16.1** Construction Dust Assessment Study Area.

Construction Phase, Operation and Maintenance Phase and Decommissioning Phase Vehicle Emissions

16.4.4 In accordance with the DMRB LA105 guidance (Ref.27), the Study Area for vehicle emissions comprises an area within 200m of the Affected Road Network (ARN). For this assessment, the ARN is defined as any roads which exceed any of the IAQM development control guidance (Ref.23) traffic screening criteria. The screening criteria provide the thresholds above which an assessment may be necessary. There are thresholds for the daily flows of Light Duty Vehicles (LDVs) and Heavy-Duty Vehicles (3.5t) (HDVs), which vary depending on whether an AQMA is present or not. Where the criteria are met, an assessment is generally considered necessary to determine the concentrations of pollutants in ambient air at human or ecological receptors adjacent to the roads that meet the criteria. The IAQM screening criteria are as follows:

- A change in LDV flows of more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA, or more than 500 AADT elsewhere;
- A change in HDV flows of more than 25 AADT within or adjacent to an AQMA, or more than 100 AADT elsewhere;
- Where a road is realigned by 5m or more and is within an AQMA; and
- Where a junction is added or removed close to existing receptors.

Construction Phase Non-Road Mobile Machinery Emissions

16.4.5 No specific guidance exists on the definition for a Study Area for Non-Road Mobile Machinery Emissions (NRMM) point source due to the large variation in potential impact from different types and specifications of NRMM. As discussed below, emissions from NRMM will be considered at ES stage once more information is available on these sources. An appropriate Study Area will be determined according to the likely impact of the NRMM deployed on site, should the NRMM require quantitative assessment.

Operation and Maintenance Phase BESS Fire Emissions

16.4.6 There is no guidance that exists on the assessment of emissions from BESS fires. It is anticipated that the Study Area would include human and ecological receptors up to several kilometres from the BESS, based on professional experience of assessing emissions from similar Schemes, and based on air quality assessments undertaken for fires at similar BESS sites.

Construction Dust

16.4.7 During the construction phase, there is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined in the IAQM construction dust guidance (Ref.22). The methodology is summarised in the following paragraphs and detailed assessment steps are presented in **Volume 3, Appendix 16.1**.

16.4.8 There is also the potential for fugitive dust emissions during the decommissioning phase. Details regarding decommissioning phase activities are limited, however the potential effects on air quality associated with the decommissioning phase are considered to be similar to those risks identified during the construction phase. As such, the assessment undertaken for construction dust is considered applicable in relation to decommissioning.



Sensitivity of Receptors

- 16.4.9 The sensitivity of the area to dust impacts, can be defined as low, medium or high sensitivity, in accordance with IAQM construction dust guidance (Ref.22).
- 16.4.10 The influencing factors to define receptor sensitivity to dust impacts are as follows:
- High – where human receptors expected to be present continuously for extended periods of time e.g. residential properties, hospitals, schools and care homes. Internationally or nationally designated ecological sites;
 - Medium – where users would expect to enjoy a reasonable level of amenity and value could be diminished by dust soiling e.g. parks and places of work. Nationally designated ecological sites; and
 - Low – where enjoyment of amenity would not reasonably be expected and exposure would be for limited periods e.g. footpaths, shopping streets and car parks. Locally designated ecological sites.
- 16.4.11 The IAQM construction dust guidance (Ref.22) defines a human receptor as “*any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM over a time period relevant to the air quality objectives, as defined in the Government’s technical guidance for Local Air Quality Management. In terms of annoyance effects, this will most commonly relate to dwellings, but may also refer to other premises such as buildings housing cultural heritage collections (e.g. museums and galleries), vehicle showrooms, food manufacturers, electronics manufacturers, amenity areas and horticultural operations (e.g. salad or soft-fruit production)*”.
- 16.4.12 An ecological receptor is defined as “*any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats)*”.

Magnitude of Impacts

- 16.4.13 The scale and nature of the works determines the magnitude of dust emissions arising as small, medium or large. IAQM construction dust guidance (Ref.20) provides the following criteria to define the potential magnitude of dust emission:
- Small – demolition volume under 12,000m³, demolition activities less than 6m above ground level, total site area less than 18,000m², soil type with large grain size, construction material with low potential for dust release, less than 20 outward HDV trips per day, unpaved road length less than 50m;
 - Medium – demolition volume 12,000m³ – 75,000m³, demolition activities 6m – 12m above ground level, total site area 18,000m² – 110,000m², moderately dusty soil type, potentially dusty construction material, 20 to 50 outward HDV trips per day, unpaved road length 50 – 100m.; and
 - Large – demolition volume greater than 75,000m³, on-site crushing and screening demolition, demolition activities greater than 12m above ground level, total site area greater than 110,000m², more than 10 heavy earth moving vehicles active at any one time, on site concrete batching, sandblasting, more than 50 outward HDV trips per day, unpaved road length greater than 100m.

Assessment of Significance

- 16.4.14 The IAQM construction dust guidance (Ref.22) categorises the unmitigated risk of dust impacts on human health and amenity (rather than ascribe a significance of effect) as a means of identifying the level of dust emissions mitigation required to ensure that residual effects are ‘not significant’. The risk of dust impact categories are presented in **Tables 2.9.A.6 to 2.9.A.8 in Volume 3, Appendix 16.1**. A higher dust risk rating requires more stringent mitigation measures in order to limit residual effects.



Construction, Operation and Maintenance and Decommissioning Vehicle Emissions

16.4.15 The potential for air quality impacts to occur from vehicle emissions during the construction, operation and maintenance and decommissioning phases has been reviewed in Section 16.8 based on the information available at this stage of the Scheme.

16.4.16 The requirement for emissions from vehicles to be quantitatively assessed will be determined at ES stage by comparing the traffic impacts of the Scheme against IAQM traffic screening criteria. Should screening of the traffic data indicate that any of the IAQM traffic criteria are met, then potential impacts of vehicle emissions at sensitive receptors will be assessed using Atmospheric Dispersion Modelling Software (ADMS) to calculate the Scheme related change in NO₂ and particulate matter (PM) concentrations at human receptors.

Sensitivity of Receptors

16.4.17 The guidance LAQM (TG22) (Ref.25) defines a sensitive receptor as a location representative of human (or ecological) exposure to a pollutant, over a time period relevant to the objective that is being assessed against, where the Air Quality Strategy objectives are considered to apply, as detailed in **Table 16.3**.

Table 16.3: Examples of Locations where AQS Objectives apply

Averaging Period	Objectives should apply at	Objectives should not apply at
Annual Mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
24-Hour Mean	All locations where the annual mean objective would apply, together with hotels and gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-Hour Mean	All locations where the annual mean and 24-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

Magnitude of Impacts

16.4.18 The magnitude of change in air quality will be calculated based on IAQM development control guidance (Ref.23) according to the percentage change in concentration between the ‘without Scheme’ and ‘with Scheme’ scenarios relative to the relevant AQS objectives. When this magnitude of change is used together with the total concentration predicted at each receptor (in relation to the AQS objective) it allows the calculation of an impact descriptor (negligible, slight, moderate or substantial) as shown in **Table 16.4**.



Table 16.4: IAQM Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to Air Quality Assessment Level (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

Assessment of Significance

16.4.19 The IAQM development control guidance (Ref.23) notes that the impact descriptors in **Table 16.4** are for individual receptors only and the overall significance of effect should be determined using professional judgement, taking into the degree of impact and factors such as:

- The existing and future air quality in the absence of the development;
- The extent of current and future populations exposure to the impact; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

Construction Phase NRMM Emissions

16.4.20 A preliminary review of the potential for NRMM emissions to significantly affect air quality has been undertaken based on LAQM (TG22) (Ref.25) guidance and previous project experience of assessing impacts from this type of emissions source.

16.4.21 An assessment of the air quality impacts from NRMM emissions during construction will be undertaken at ES stage once further details about the proposed construction plant is available. Should dispersion modelling of NRMM emissions be required then the sensitivity of receptors, magnitude of impact and assessment of significance would be determined using the same approach as described above for the assessment of vehicle emissions.

Operational and Maintenance Phase BESS Fire Emissions

16.4.22 Associated infrastructure for the Scheme such as BESS, and Substations have the potential to cause air quality impacts in the rare result of a fire incident.

16.4.23 There is limited real world data collated on fires associated with solar schemes, and the data that does exist is mainly derived from a limited number of testing studies used to evaluate the extent of thermal runaway and its propagation through a BESS for example.

16.4.24 The potential air quality effects of a fire will be strongly influenced by how close the fire is to sensitive receptors such as residential properties. These air quality effects will be determined at ES stage once the final BESS arrangement/layout is confirmed and once more research has been undertaken into the emission parameters such as pollutant emission rates from a fire to a BESS of this specification.



16.4.25 A review of the potential air quality effects of a fire to the BESS has been undertaken for the PEIR based on data derived from fire testing studies and recent air quality impact assessments of BESS fires associated with similar Schemes. It is anticipated that dispersion modelling of the fire would be undertaken for the ES, following the air emissions risk assessment guidance for permitting (Ref.25) and that the sensitivity of receptors, magnitude of impact and assessment of significance would be determined using the same approach as described above for the assessment of vehicle emissions. It is anticipated that the assessment would include quantification of changes in concentrations of pollutants such as NO₂, PM₁₀ and carbon monoxide (CO) at receptors. The assessment would also compare predicted concentrations against Acute Exposure Guidance Levels (AEGL), which have higher threshold concentrations than the national air quality objectives and are relevant to short term releases. The occurrence of adverse health effects is not likely to occur in the general public at concentrations below the AEGLs.

16.5 Assessment Assumptions and Limitations

16.5.1 This preliminary assessment is based on baseline and Scheme design information available at the time of writing this chapter. A full assessment is being undertaken as part of the EIA, the assessment will be developed and refined following statutory consultation and as additional information becomes available, the final assessment presented within the ES.

16.5.2 Where the scheme designs and details are either not yet known or incomplete at this stage, either assumptions have been made based on professional judgment, or, in the event that it is not possible to make any assumptions, no attempt at a full assessment has been made. This assessment is an iterative process and will be both expanded and made more specific as survey data is collected, analysed and reported on, and designs are further developed. This process will be carried out in conjunction with relevant consultees and third parties as necessary to achieve the most robust outcome.

16.5.3 The methodology for air quality has considered the following assumptions:

- It is assumed that all construction activities other than construction traffic will take place within the Scheme's boundary;
- There is limited detail available for the proposed NRMM, therefore detailed assessment has not been possible at this stage and will be considered in the ES;
- A review of the potential air quality effects of a fire to the BESS has been undertaken for the PEIR based on data derived from fire testing studies and recent air quality impact assessments of BESS fires associated with similar Schemes. The air quality effects will be modelled at ES stage once the final BESS arrangement/layout is confirmed and once more research has been undertaken into the emission parameters such as pollutant emission rates from a fire to a BESS of this specification;
- The traffic impacts of the operation and maintenance phase and the decommissioning phase are expected to be lower than the construction phase, therefore based on the construction traffic assessment, it is anticipated that air quality effects of operation and maintenance and decommissioning would not be significant;
- The construction information used for the assessment of construction dust is subject to change as the EIA process progresses. Any changes that could affect conclusion of the construction dust assessment will be stated and reassessed in the ES. However, it is anticipated that any changes to proposed construction activities are not likely to change the conclusion of the construction dust assessment; and
- There is limited detail regarding decommissioning activities. Potential effects on air quality associated with dust generated during the decommissioning phase are considered to be similar to those risks identified during the construction phase. As such, the assessment undertaken for construction phase dust effects is considered applicable in relation to decommissioning.



16.6 Baseline Conditions

16.6.1 This section describes the baseline environmental characteristics for the Scheme and surrounding areas with specific reference to air quality.

Existing Baseline

16.6.2 The existing baseline conditions are derived from desk-based studies.

16.6.3 Baseline information on air quality has been collected from the following sources:

- Defra UK Air website (Ref.30) – to establish predicted background concentrations for NO₂, PM₁₀ and PM_{2.5};
- North Northamptonshire Council website (Ref.31) and 2023 Air Quality Annual Status Report (ASR) (Ref.32) – to determine existing AQMAs and local air quality monitoring results;
- West Northamptonshire Council website (Ref.33), the 2022 Air Quality ASR (Ref.34) and 2022 air quality monitoring data provided by the Council (Ref.35) – to determine existing AQMAs and local air quality monitoring results;
- Milton Keynes City Council website (Ref.36) and 2023 Air Quality ASR (Ref.37) - to determine existing AQMAs and local air quality monitoring results; and
- MAGIC website (Ref.38) – to identify ecological sites within the air quality study areas.

North Northamptonshire

16.6.4 North Northamptonshire Council (NNC) manage air quality in the context of Local Air Quality Management. NNC have not declared any AQMAs. As stated in NNC's Air Quality ASR 2023 (Ref.30), the Council monitors NO₂ at 100 diffusion tube monitoring sites across North Northamptonshire. The 2023 Air Quality ASR produced by NNC stated that during 2022, none of these monitoring sites exceeded the annual mean AQS objective for NO₂ or hourly mean air quality objective for NO₂.

16.6.5 North Northamptonshire currently does not monitor concentrations of PM_{2.5} and PM₁₀, however it does take measures to address PM_{2.5} pollution which are listed in the Air Quality ASR (Ref.32).

West Northamptonshire

16.6.6 There are eight AQMAs in West Northamptonshire all of which were declared for exceedance of the NO₂ annual mean AQS Objective. According to the most recent air quality monitoring data provided by the Council, in 2022 only one of the AQMAs contained monitoring sites that exceed the annual mean AQS Objective for NO₂. Northampton AQMA No. 4 is the closest AQMA to the Scheme, located approximately 5.5km from the Scheme and is situated along the A5095, to the north of the town of Northampton. This AQMA is shown in **Figure 16.2**. Monitoring data recorded within Northampton AQMA No. 4 during 2022 showed an exceedance at monitoring site 57 with an annual mean NO₂ concentration of 43.7 µg m³. The other AQMAs are all located over 7km away from the Scheme, either in the centre of Northampton, or to the south of the town.

16.6.7 Across the entirety of West Northamptonshire Council, there are 143 passive air quality monitors and one automatic monitoring station (AURN site UKA00632 located in the town of Northampton) measuring NO₂. As reported in the most recent air quality monitoring data provided by the Council, there are two monitoring stations that exceed the annual mean NO₂ AQS Objective in 2022:

- Monitoring site 57, situated in Northampton AQMA No. 4, approximately 5.5km from the Scheme boundary; and
- Monitoring site 74, situated on Bradshaw Street, approximately 7.7km from the Scheme boundary

16.6.8 The AURN monitoring station described above also monitors PM_{2.5}. All PM_{2.5} concentrations were well below the AQS objective between 2017 and 2022 WNC does not undertake any monitoring of PM₁₀.

Milton Keynes City Council

- 16.6.9 There is one AQMA within the administrative boundary of Milton Keynes City Council (MKCC) - Olney AQMA, which is shown in **Figure 16.2**. Olney AQMA was declared in 2008 for exceedance of the annual mean AQS Objective for NO₂. According to the most recent Air Quality ASR (Ref.37), monitored annual mean NO₂ concentrations within the AQMA were below the annual mean AQS Objective in 2022.
- 16.6.10 Olney AQMA is situated along the A506, approximately 3km south of the closest boundary of the Scheme (Green Hill G) and approximately 10km north of the city of Milton Keynes.
- 16.6.11 Across the entirety of MKCC there are three automatic monitoring stations and 37 passive monitoring sites for NO₂. As reported in the most recent annual status report (Ref.37), there were no monitored exceedances of the annual mean NO₂ AQS Objective.
- 16.6.12 There is one monitoring location in MKCC that monitors PM₁₀ and PM_{2.5} concentrations. This is at site 'Fixed', located in the centre of Milton Keynes. Annual mean PM₁₀ and PM_{2.5} concentrations monitored at this location in 2022 were below annual mean AQS Objectives, and the 24-hour mean AQS objective for PM₁₀ was also not exceeded.

Air Quality Monitoring

- 16.6.13 NNC and WNC have 17 and MKCC have 11 passive monitoring sites for NO₂ within 5km of the Scheme, respectively. **Table 16.5** presents the five most recent years of available air quality monitoring results at these sites. The location of each site is presented in **Figure 16.2**. In the past five years there was one exceedance of the NO₂ annual mean AQS Objective at W1 in 2019 and exceedances of the NO₂ annual mean AQS Objective at site 85 in 2018 and 2019. W1 is located in the centre of Wellingborough approximately 3.5km east of the Scheme, and site 85 is located in Northampton approximately 5.5 km west of the Scheme.
- 16.6.14 All NNC, WNC and MKCC monitoring sites within 5km of Scheme monitored annual mean NO₂ concentrations well below the AQS Objective in 2022, with the exception of monitoring site 91 where the annual mean concentration was 39.0 µg/m³. This monitoring site is located approximately 4km south-west from the Scheme along the main access road to Crow Lane industrial estate.
- 16.6.15 The closest PM monitoring station to the Scheme is located in the town of Northampton approximately 6km south-west of the Scheme. The annual average PM_{2.5} concentration in 2022 was 8.2 µg/m³ which is well below the annual mean AQS Objective for PM_{2.5} of 25 µg/m³. PM₁₀ is not monitored at this monitoring station.



Figure 16.2 Local Air Quality Monitoring Locations and AQMAs (Page 1 of 2)

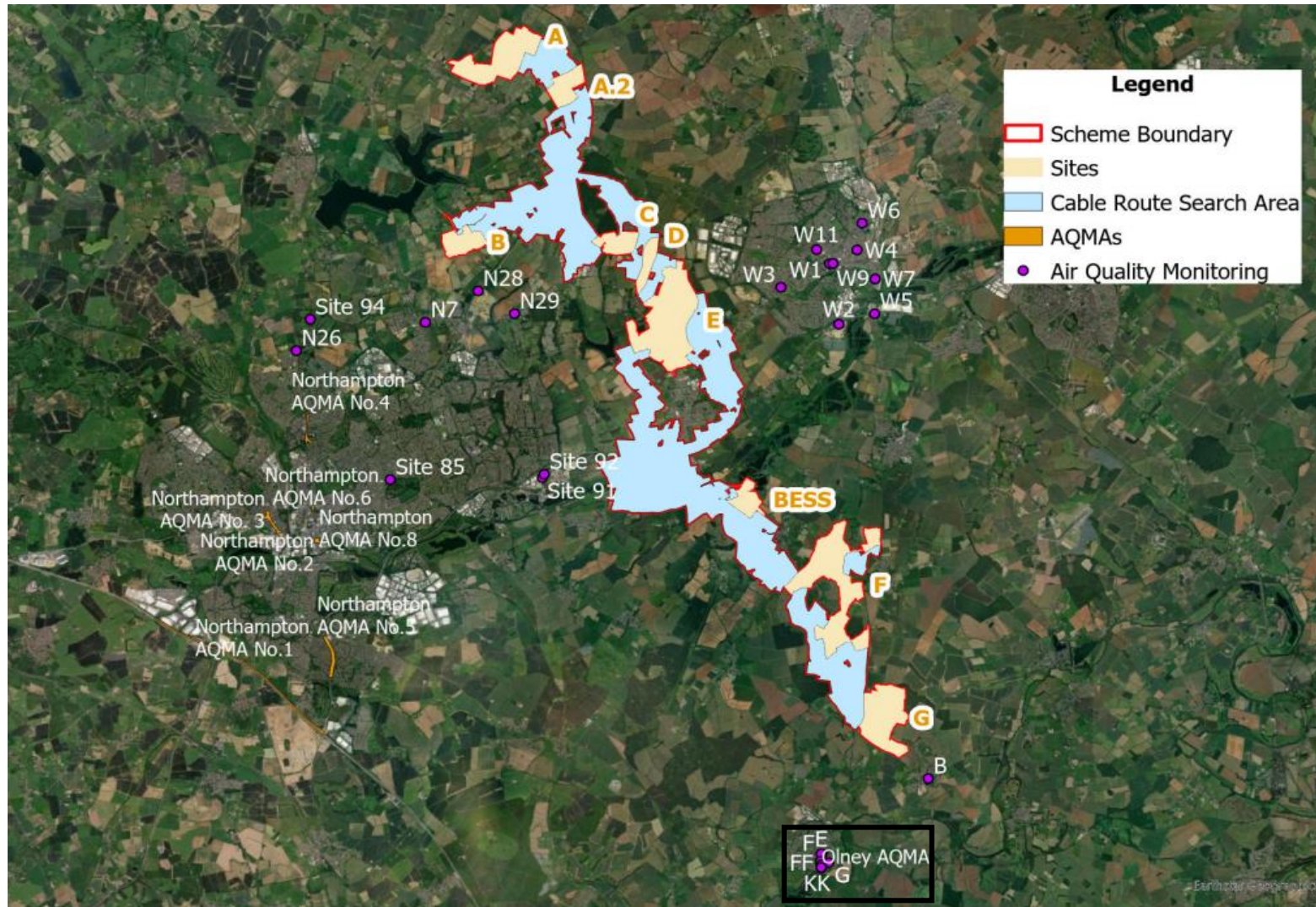




Figure 16.2 Local Air Quality Monitoring Locations and AQMAs (Page 2 of 2)

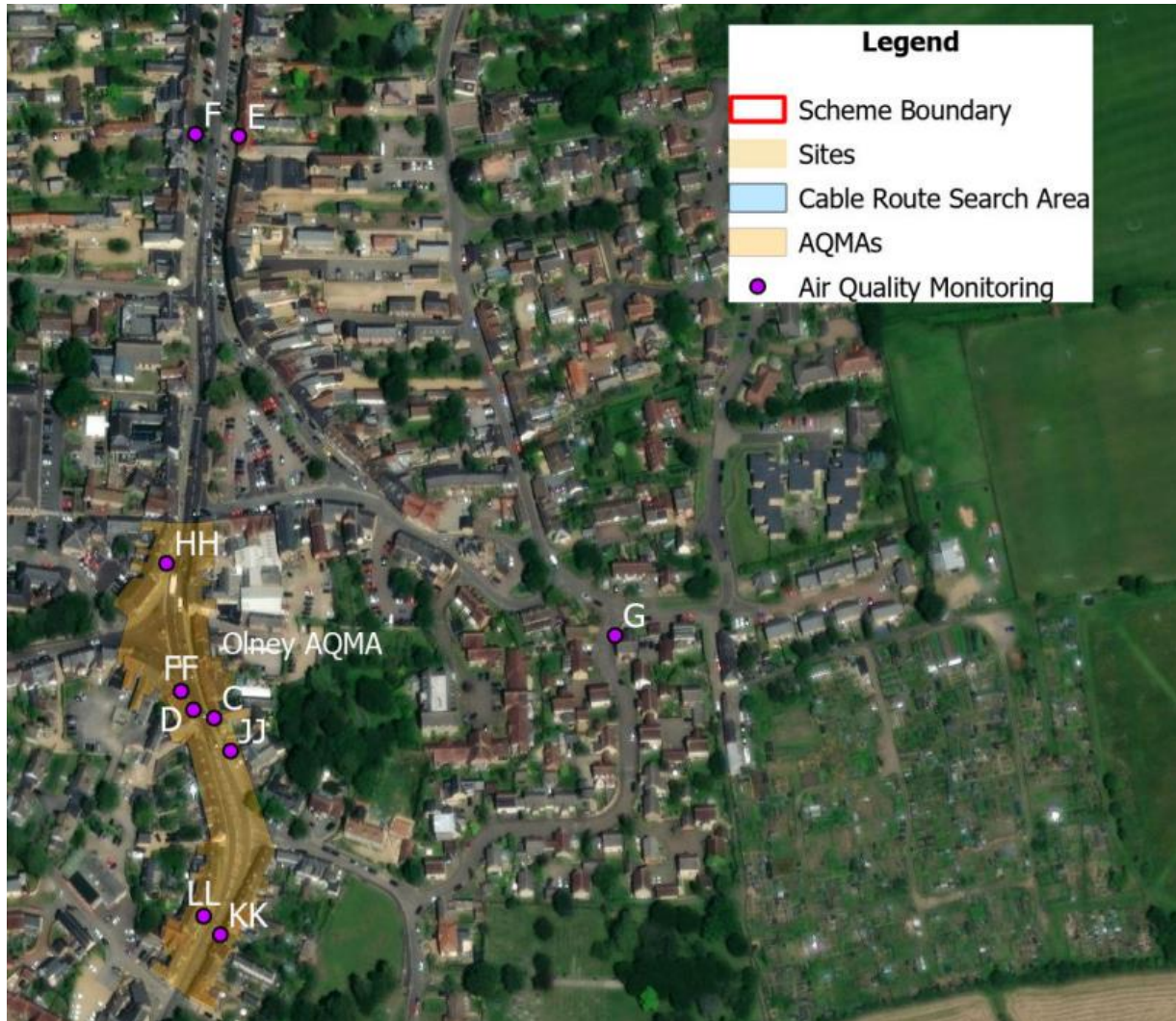




Table 16.5: 2018 - 2022 Annual Mean NO₂ Concentrations within 5km of the Site and Cable Route Search Area Boundary

Site Name	X (m) OS Grid	Y (m) OS Grid	Local Authority	Site Type	Location	Annual Mean NO ₂ (µg m ⁻³)				
						2018	2019	2020	2021	2022
W1	489131	267820	NNC	Urban Centre	Silver Street	35.8	42.3	30.2	32.2	30.2
W2	489382	266144	NNC	Kerbside	Alma Street	22.7	28.6	20.5	22.9	20.8
W3	487831	267169	NNC	Roadside	Northampton Road	22.8	25.8	18.8	20.5	20
W4	489868	268204	NNC	Kerbside	Finedon Road	18.9	25.2	16.1	16.0	15.3
W5	490336	266433	NNC	Roadside	Butlin Court	20.2	21.4	15.9	16.5	16.5
W6	490002	268946	NNC	Urban Background	Mill Road	15.7	18.7	13.8	14.0	13.5
W7	490351	267400	NNC	Roadside	Ultra Close	25.1	27.8	20.6	22.0	22
W9	489226	267829	NNC	Urban Background	Market Street	21.0	23.3	15.8	17.0	18.4
W11	488788	268215	NNC	Roadside	Broad Green	24.3	29.8	21.4	24.3	22.3
N7	478331	266195	WNC	Roadside	Post Office, Moulton	22.2	21.4	15.6	16.7	16.8
N26	474883	265412	WNC	Roadside	Boughton 1st lamppost on right (Buckton Fields)	24.4	23.5	17.5	18.0	17.4
N28	479739	267067	WNC	Roadside	Moulton A43 lamppost by new estate	-	-	13.1	14.0	12.9
N29	480712	266438	WNC	Roadside	Overstone - lamppost by no. 120 Sywell Road	-	-	18.6	21.9	21.0
85	477391	261834	WNC	Roadside	Archway Cottages, Wellingborough Road	40.5	44.4	33.6	34.0	36.4
91	481457	261889	WNC	Roadside	Home from Home Nursery, 6 -10 Crow Lane	-	-	-	39.8	39.0
92	481508	261983	WNC	Kerbside	Lower Ecton Lane/ Crow Lane Junction	-	-	-	26.7	24.6
94	475254	266282	WNC	Urban Background	Commercial Street Carpark - Outdoor Market	-	-	-	-	19.2



Site Name	X (m) OS Grid	Y (m) OS Grid	Local Authority	Site Type	Location	Annual Mean NO ₂ (µg m ⁻³)				
						2018	2019	2020	2021	2022
B	491769	253542	MKCC	Roadside	Northampton Rd, Lavendon (Horseshoe PH)	17.4	18.8	14.8	14.5	12.8
C	488914	251173	MKCC	Roadside	10 High St South, Olney (Cowper School House)	33.9	36.4	28.5	31.6	26.5
D	488904	251177	MKCC	Roadside	9 High St South, Olney (Olney Wine Bar)	30.2	30.9	24.7	33.3	29.1
E	488926	251455	MKCC	Roadside	20 High St, Olney	21.3	19.8	17.4	18.3	14.9
F	488905	251456	MKCC	Roadside	17 High St, Olney (Opp No.20 High St)	23.1	25.1	19.6	20.7	17.8
G	489108	251213	MKCC	Suburban	Corner of Coneygere and Palmers Rd, Olney	10.8	11.1	8.8	9.4	7.9
FF	488898	251186	MKCC	Roadside	Cross Keys Office, High St South, Olney	30.6	34	27.5	27.7	25.3
HH	488891	251248	MKCC	Roadside	Art Mart, 33 High Street South, Olney	26.6	27.9	23.1	25.3	20.7
JJ	488922	251157	MKCC	Roadside	New Roadbox location (Olney)	23.5	18.4	19.9	21.5	16.9
KK	488917	251068	MKCC	Roadside	18/20 Bridge St, Olney	32.9	34.7	28.7	31.3	26.8
LL	488909	251077	MKCC	Roadside	Courtney House, Bridge St, Olney	28.1	29.6	25.1	26.6	21.8



Background Concentrations

16.6.16 A review of background pollutant concentrations for the Sites has been carried out using Defra predicted annual mean background maps provided in 1km x 1km grid squares. **Table 16.6** presents the highest predicted background NO₂, PM₁₀ and PM_{2.5} concentrations for each Site within the Scheme.

Table 16.6: Maximum Predicted 2024 Background Concentrations across the Green Hill (A-G and BESS)

Green Hill Site	2024 Pollutant Concentration (µg/m ³)		
	NO ₂	PM ₁₀	PM _{2.5}
A	7.4	14.8	8.6
A.2	7.4	14.8	8.6
B	7.2	13.7	8.2
C	7.4	13.4	8.2
D	7.6	13.6	8.3
E	8.6	14.8	8.7
F	7.1	14.6	8.6
G	6.9	14.2	8.5
BESS	7.5	14.6	8.5

16.6.17 The predicted background concentrations presented in **Table 16.6** are well below the relevant AQS objectives for each pollutant. The 2024 background data is presented as this is worst-case given that the Defra concentrations predict a year-on-year decrease in background concentrations for all pollutants.

Designated Ecological Sites

16.6.18 The ecological designated sites listed below are located within 50m of the Scheme’s boundary and could be adversely affected by dust emissions associated with the construction and decommissioning of the Scheme.

Table 16.7: Ecological Designated Sites located within 50m of the Scheme Boundary

Site Name	Designation
Hardwick Lodge Meadow	Site of Special Scientific Interest (SSSI)
Bozeat Meadow	SSSI
Hardwick Wood	Ancient Woodland (AW)
Nun Wood	AW
Sywell Wood	AW
Three Shire Wood	AW
Horn Wood	AW



Site Name	Designation
Barslay Spinney	AW
Broadlane Spinney	AW
Nene Valley	Nature Improvement Area (NIA)
Upper Nene Valley Gravel Pits	Special Protection Area (SPA)
Upper Nene Valley Gravel Pits	RAMSAR site (international)

Future Baseline

- 16.6.19 This section considers changes to the baseline conditions, described above, that might occur in the absence of the Scheme and during the time period over which the Scheme would be in place. The future baseline scenarios are set out in **Chapter 2: EIA Process and Methodology**.
- 16.6.20 In the absence of the Scheme, it is anticipated that there would be reductions in pollutant concentrations in the future. Background pollutant concentrations and emissions from newer vehicles (zero emission and Euro 6/VI engine emission standards) are expected to improve air quality over time, as older, more-polluting vehicles are replaced in the vehicle fleet. Decarbonisation of the vehicle fleet in response to Government policy such as the Transport Decarbonation Plan (Ref.38), and the Net Zero Highways Plan (Ref.40) are expected to deliver future air quality improvements. These future air quality improvements are expected to lead to lower NO₂, PM₁₀ and PM_{2.5} concentrations than reported for the existing baseline by the time construction begins on the Scheme and by the time the Scheme is operational.

16.7 Embedded Mitigation Measures

- 16.7.1 The way that potential environmental impacts have been or will be prevented, avoided or mitigated to reduce impacts to a minimum through design and/or management of the Scheme is outlined in this section and will be considered as part of the assessment of the potential effects. Proposed environmental enhancements are also described where relevant.
- 16.7.2 The following embedded mitigation measures have been incorporated into the Scheme design, with detailed proposals and locations to be submitted with the DCO application. The embedded mitigation measures include:
- Sensitive routeing and siting of infrastructure (for the operational phase);
 - Sensitive siting of temporary works (for the construction phase);
 - Commitments made within a Construction Environmental Management Plan (CEMP) (for the construction phase). Air quality specific measures determined as part of this assessment that have been incorporated into the CEMP are outlined in Table 15 of **Volume 3, Appendix 16.1**; and
 - Measures included in the Outline Battery Fire Safety Management Plan. This would include measures to limit human exposure to air pollution in the event of a fire. Measures are likely to include for example, notification of potentially affected residents including advice on the health effects of smoke and ways to reduce exposure (e.g. close windows and stay indoors), cancellation of outdoor events and potentially moving affected residents to a cleaner air location. This Plan would be developed following completion of the air quality modelling of the BESS fire.

16.8 Assessment of Likely Impacts and Effects

- 16.8.1 Taking into account the embedded mitigation measures as referred to in Section 16.7, the potential for the Scheme to generate effects was assessed using the methodology as detailed in



Section 16.4 of this Chapter. In the sections below, associated impacts and effects during the construction, operation and decommissioning phases of the Scheme are discussed.

Construction Phase

Construction Dust

- 16.8.2 Construction dust generated from trackout (transportation of dust and dirt onto the public road network), earthworks and construction activities has the potential to adversely affect human health when airborne, and the potential to adversely affect people, property and sensitive ecological habitats through deposition and soiling. The construction dust impact assessment for the Scheme, as outlined in **Volume 3, Appendix 16.1** determined that, without mitigation, the worst-case risk of dust effects would be high. In accordance with the IAQM construction dust guidance (Ref.22), the risk assessment is used to define appropriate measures to ensure that dust effects are mitigated such that there would be no significant air quality effect. These measures have been identified in Table 15 of **Volume 3, Appendix 16.1** and will be incorporated into a CEMP following final assessment in the ES.

Construction Vehicle Emissions

- 16.8.3 Emissions from construction vehicles have the potential to affect air quality at human and ecological receptors located within 200m of routes used by these vehicles. Preliminary construction traffic flows for the Scheme have been provided by KMC Transport Planning.
- 16.8.4 There are no AQMAs within 200m of roads affected by construction traffic and therefore construction vehicle movements have been compared against the 500 (for LDVs) and 100 (for HDVs) AADT traffic change criteria in the EPUK/IAQM guidance (Ref.23) to determine if an air quality assessment is required.
- 16.8.5 The maximum combined 2-way change in LDV flows associated with the construction phase is expected to occur along the A509 between Sywell Road and the A5128 (Northampton Road). An increase of LDV flows of 356 vehicles per day is anticipated along this road corridor during construction. The change in construction LDV flows is therefore expected to be below the 500 AADT change criteria across all roads.
- 16.8.6 The maximum combined 2-way change in HDV flows associated with the construction phase is expected to occur on the A45, east of the A509, where an increase of 65 vehicles per day is anticipated during construction. The change in construction HDV flows is therefore expected to be well below the 100 AADT change criteria across all roads.
- 16.8.7 As the predicted construction traffic flows would be below the AADT traffic change criteria in the EPUK/IAQM guidance (Ref.23), air quality effects of construction vehicles can be screened out of the assessment.

NRMM Emissions

- 16.8.8 Exhaust emissions of pollutants including NO₂ and PM₁₀ would occur from onsite plant (NRMM). However, there is insufficient information available at this stage of the Scheme to assess the likely impacts of emissions from NRMM. The potential air quality effects of NRMM will be determined at ES stage once more information is available on the number and type of plant associated with each site.

Significance of Effect

Construction Dust

- 16.8.9 Dust generated from construction activities would be temporary in nature and be suitably controlled through the good practice measures identified in **Table 15** of **Volume 3, Appendix 16.1** and will be incorporated into a CEMP following final assessment in the ES.
- 16.8.10 Following adoption of the good practice measures identified construction dust effects would not be significant.



Construction Vehicle Emissions

- 16.8.11 Based on preliminary construction traffic generation figures available at this stage of the Scheme, air quality effects from construction vehicles are not expected to be significant.

NRMM Emissions

- 16.8.12 Emissions from NRMM would be temporary and minimised through the application of mitigation measures identified in **Table 15** of **Volume 3, Appendix 16.1**, which will be outlined in the OCEMP. Given individual plant would operate for relatively short periods of time in any given area and considering the mitigation measures that would be employed, it is unlikely that emissions from NRMM would trigger a significant effect. LAQM (TG22) (Ref.25) states that “*Experience of assessing the exhaust emissions from on-site plant (NRMM) and site traffic suggests that, with suitable controls and site management, they are unlikely to make a significant impact on local air quality*”.
- 16.8.13 The significance of air quality effects associated with emissions from NRMM will however be determined at ES stage.

Operation and Maintenance Phase

Operation and Maintenance Vehicle Emissions

- 16.8.14 Once the Scheme is operational, traffic generated by it will be limited to that associated with maintenance work and the scheduled replacement activities required of panels and batteries. As described in **Chapter 13: Transport and Access** of this PEIR, the traffic movements associated with the operation and maintenance phase are expected to be below those associated with the construction phase. It is therefore expected that the operation and maintenance traffic impacts would be below the IAQM traffic screening described in Section 16.4 and so would not require assessment in in the ES as the air quality effects would be negligible. This will be confirmed at ES stage.

BESS Fire Emissions

- 16.8.15 The proposed BESS has the potential to give rise to air quality effects in the rare event of a fire. There is limited real world data collated on battery fires, and the data that does exist is mainly derived from a limited number of testing studies used to evaluate the extent of thermal runaway and its propagation through a BESS. Data on hazards such as heat, smoke and release of toxic gases has been collated from some of these studies and the pollutants emitted are likely to include carbon monoxide (CO), oxides of nitrogen (NOx), hydrogen fluoride (HF), hydrochloric acid (HCl) and hydrocarbons such as formaldehyde (Ref.41).
- 16.8.16 The air quality impact of a potential fire to the BESS will be strongly influenced by how close the fire is to sensitive receptors such as residential properties. These air quality effects will be determined at ES stage once the final BESS arrangement/layout is confirmed and once more research has been undertaken into the emission parameters such as pollutant emission rates from a fire to a BESS of this specification.
- 16.8.17 It should be noted that air quality impact assessments of BESS fire incidents were recently undertaken for the West Burton Solar Project (Ref.42) and for the Cottam Solar Project (Ref.43) and concluded that a fire would not cause pollutant concentrations to exceed AQS objectives and British occupational exposure limits at receptors. In the West Burton Solar Project and Cottam Solar Project assessments, the closest residential receptor was respectively located approximately 510m and 295m from the boundary of the BESS. Although the impacts of a fire to the BESS would vary depending on factors such as the number of battery cells within a BESS enclosure, the assessments above suggest that impacts are likely to dissipate quickly the further away that receptors are from the fire, and at distances of several hundred meters away from the fire, the risk of exceedances of AQS objectives/British occupation exposure limits is likely to be low.
- 16.8.18 Air quality impacts from a fire to the BESS are expected to be short-term (e.g. a couple of hours) due to the likely short-term nature of any fire incident. A fire to the BESS is therefore unlikely to



affect compliance against annual mean AQS objectives but if burning for sufficient time, could affect compliance against short term AQS objectives such as the 1-hour mean NO₂ AQS objective. The closest human receptor to the BESS Site is associated with a farm and is located approximately 170m north of land parcel BESS2, off Station Road. There is also a cluster of residential receptors located approximately 380m south of land parcel BESS1, on Station Road. Nene Valley Gravel Pits Special Protection Area (SPA), Ramsar and Site of Special Scientific Interest (SSSI) is an ecological site located directly adjacent to the BESS3 land parcel and would also be sensitive to any air quality effects associated with a fire.

- 16.8.19 For Site C, there are residential receptors located on Sywell Road, close to the southern boundary of the site. The closest residential receptor is located at Woodlodge Farm, within approximately 20m of the Site C boundary. However, it should be noted that these distances are based on the boundary of Site C, and the BESS enclosures are expected to be located considerably further away from receptors than this.

Significance of Effect

Operation and Maintenance Vehicle Emissions

- 16.8.20 Due to the low level of trips likely to be generated by the Scheme during operation and maintenance it is expected that air quality effects from vehicle emissions would not be significant.

BESS Fire Emissions

- 16.8.21 The significance of effects associated with the rare incident of a fire to the BESS will be determined at ES stage.

Decommissioning Phase

Dust and NRMM Emissions

- 16.8.22 There is the potential for fugitive dust emissions and NRMM emissions during the decommissioning phase. Details regarding the decommissioning phase activities are limited as this stage of the Scheme, however the potential effects are likely to be similar to those identified during the construction phase.

Decommissioning Vehicle Emissions

- 16.8.23 As described in **Chapter 13: Transport and Access** of this PEIR, the traffic movements associated with the decommissioning phase are expected to be below those associated with the construction phase. It is therefore expected decommissioning traffic impacts would be below the IAQM traffic screening described in Section 16.4 and so would not require assessment in the ES as the air quality effects would be negligible. This will be confirmed at ES stage.

Significance of Effect

Dust and NRMM Emissions

- 16.8.24 The significance of dust effects associated with decommissioning is expected to the same as described for construction and so not significant following the adoption of good practice measures as identified in **Table 15 of Appendix 16.1** and the OCEMP. These measures will be included in a Decommissioning Environmental Management Plan (DEMP), and secured by a requirement in the DCO.

- 16.8.25 The significance of air quality effects associated with emissions from NRMM will be determined at ES stage.

Decommissioning Vehicle Emissions

- 16.8.26 Due to the low level of trips likely to be generated by the Scheme during decommissioning it is expected that air quality effects from vehicle emissions would not be significant.

16.9 Additional Mitigation Measures

- 16.9.1 Mitigation measures to control dust and NRMM emissions during the construction phase will be



incorporated into a CEMP following final assessment in the ES and, depending on what is considered appropriate, the CEMP can incorporate a range of standard, good practice tools for managing these impacts, for example planning site layout so machinery and dust generating activities are located away from receptors, as far as is possible and erecting solid barriers around dust causing activities or the site boundary.

16.9.2 Any additional mitigation measures required during construction, operation and maintenance and decommissioning phases will be identified in the ES.

16.9.3 Measures to limit human exposure to air pollution in the event of a fire of the BESS during the operation phase will be incorporated into an Outline Battery Fire Safety Management Plan, following completion of the air quality modelling of the BESS fire.

16.10 Residual Effects

16.10.1 This section summarises the residual significant effects of the Scheme following the implementation of the mitigation as outlined in Section 16.9 of this chapter.

16.10.2 The residual air quality effects of dust associated with the construction phase are expected to be not significant following application of industry best practice measures to control dust.

16.10.3 Residual impacts of emissions from construction, operation and maintenance and decommissioning road traffic are also expected to be not significant. It should be noted that the assessment of these effects is based on preliminary information available at this stage of the Project and these effects will be reassessed in the ES.

16.10.4 Emissions from NRMM would be temporary and minimised through the application of mitigation measures which will be outlined in the CEMP; it is considered unlikely that emissions from NRMM would lead to significant residual effects.

16.10.5 The residual effects associated with emissions from a fire to the BESS in the operation phase will be determined in the ES.

16.10.6 There is also the potential for dust and NRMM emissions during the decommissioning phase. Details regarding the decommissioning phase activities are limited, however the potential residual effects are likely to be similar to those identified during the construction phase.

16.11 Cumulative Effects

16.11.1 The ES will give consideration to potential cumulative effects of the Scheme and other relevant projects within the vicinity of the Scheme.

16.11.2 A list of cumulative projects can be found in **Volume 3, Appendix 2.2** of the PEIR, the list will be reviewed and refined in preparation of the DCO application submission through further consultation and will be presented and assessed in the ES. Cumulative effects will be listed within **Chapter 25: Cumulative Effects** of the ES.

Cumulative effects

16.11.3 The cumulative effects of air quality generated from the Scheme will be fully assessed in the ES and likely to consist of consideration of cumulative effects of committed development on traffic flows (and therefore vehicle emissions).

In-combination effects

16.11.4 At this stage of the project there is potential for air quality to affect the terrestrial biodiversity topic by causing degradation of sensitive habitats close to construction works because of dust and emissions from NRMM. Emissions from vehicles and a potential fire to the BESS also have the potential to affect habitats through changes in air quality such as a change in nutrient nitrogen deposition. These will be assessed further in the ES.

16.12 Summary

16.12.1 This chapter of the PEIR has identified the existing environment in relation to air quality and the potential air quality effects of the Scheme.



- 16.12.2 The construction dust risk assessment undertaken for the construction phase determined that dust effects would be not significant. Appropriate measures have been identified in Error! Reference source not found. **Volume 3, Appendix 16.1**; these will be incorporated into a CEMP following final assessment in the ES. With the implementation of these measures, the effect of construction dust is not considered to be significant.
- 16.12.3 Preliminary construction vehicle flows have been compared against IAQM and EPUK traffic screening criteria (Ref.23) and are below the criteria and so screened out of the assessment. The air quality effects of construction vehicle emissions are therefore not considered to be significant. Furthermore, traffic impacts associated with the operation and maintenance and decommissioning phases are expected to be lower than during construction, and so are also not considered to result in significant air quality effects.
- 16.12.4 Limited data is available on the quantity and type of NRMM and plant at this stage of the Project design. Emissions from NRMM would be temporary and minimised through the application of mitigation measures, which will be outlined in the CEMP. Given individual plant would operate for relatively short periods of time in any given area and considering the mitigation measures that would be employed, it is unlikely that emissions from NRMM would trigger a significant effect. The air quality effects of emissions from NRMM will be re-considered at ES stage once further details are available regarding the type of equipment, location and duration of use.
- 16.12.5 The proposed BESS has the potential to give rise to air quality effects in the rare event of a fire and these effects will be determined through dispersion modelling at ES stage once the final BESS arrangement/layout is confirmed and once more research has been undertaken into the emission parameters such as pollutant emission rates from a fire to a BESS of this specification. It should be noted that any air quality effects from a potential fire to the BESS would be managed and reduced through implementation of a fire action plan. Previous air quality modelling studies undertaken for similar BESS sites suggest that any fire to the BESS is likely to be short term (several hours) and impacts are likely to dissipate quickly the further away that receptors are from the fire. At receptor distances of several hundred meters away from the fire, the risk of exceedances of AQS objectives/British occupation exposure limits is likely to be low.
- 16.12.6 There is also the potential for fugitive dust and NRMM emissions during the decommissioning phase. Details regarding the decommissioning phase activities are limited, however the potential effects are likely to be similar to those identified during the construction phase.



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