Frodsham Solar

Environmental Statement: Volume 2
Appendix 4-2: Construction Dust Assessment

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FRODSHAM SOLAR

CONSTRUCTION DUST ASSESSMENT

For: Frodsham Solar Ltd and Axis P.E.D. Limited

Date: May 2025

Report Ref: R3091B-R01-v4

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FRODSHAM SOLAR

CONSTRUCTION DUST ASSESSMENT

For: Frodsham Solar Ltd

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Appendices

1 Introduction

1.1 General

1.1.1. This Construction Dust Assessment has been prepared by Simith Grant LLP (SGP) to inform the Environmental Impact Assessment and the outline Construction Environmental Management Plan (oCEMP) ***[EN10153/APP/7.5]*** that has been prepared for Frodsham Solar (hereafter referred to as 'the Proposed Development').

1.1.2. The proposals are for the construction of a solar energy generating station, an associated on-site Battery Energy Storage System (BESS) and other associated infrastructure. The Proposed Development is classified as a Nationally Significant Infrastructure Project (NSIP) and therefore Frodsham Solar Limited ('the Applicant') is applying for a Development Consent Order (DCO) to construct, operate and ultimately decommission the Proposed Development. The Proposed Development is considered to be 'EIA development' as defined by the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (the 'EIA Regulations'), requiring an Environmental Impact Assessment (EIA).

1.1.1 As agreed by the Planning Inspectorate (PINS) in the EIA Scoping Opinion [ES Vol 2 Appendix 1-2: Planning Inspectorate Scoping Opinion (July 2023) [EN010153/DR/6.2] Air Quality has been scoped out of the EIA on the basis that a Construction Dust Assessment would be provided in support of the ES and to inform mitigation proposals and management plans. The Scoping Opinion also notes that 'a narrow strip of the Mersey Estuary SPA, Ramsar and SSSI falls within the screening distance' and as such, the ES should consider the potential for significant effects on this area. This is addressed within this report.

1.1.2 The Order Limits comprises land at Frodsham Marsh, Frodsham, Cheshire West and Chester ('the Site') and is illustrated on ES Vol 3 Figure 1-1: Site Location [EN010153/DR/6.3].

1.2 Scope and Objectives of the Report

1.2.1 The following report describes the Construction Dust Assessment undertaken by SGP in accordance with the brief agreed with the client. The report has been prepared with reference to the Overarching National Policy Statement (NPS) for Energy (EN-1) NPS for Renewable Infrastructure (EN-3), and NPS for Electricity Networks Infrastructure (EN-5). It follows the frameworks described in guidance provided by the Institute of Air Quality Management (IAQM) in relation to planning and construction dust[1].

[1] Institute of Air Quality Management (IAQM), Guidance on the Assessment of Dust from Demolition and Construction. v2.2, January 2024

1.2.2 The report describes the methods used to assess the impacts, the baseline conditions currently existing at the Site and surroundings, the potential direct and indirect impacts of the Proposed Development arising from construction dust, and the mitigation measures required to prevent, reduce, or offset the impacts.

1.2.3 SGP is an environmental consultancy specialising in air quality assessments, particularly in association with fugitive dust emissions from construction projects. The report author, Katrina Hawkins, Partner, is a Member of the Institute of Air Quality Management (IAQM).

2 Legislation, Policy and Guidance

2.1 Technical Context

2.1.1 Construction activities can give rise to airborne particulate matter, or 'dust'. Dust can give rise to both soiling effects through dust deposition (referred to 'disamenity dust') and human health effects through suspended particulates. Dust accumulation may also affect sensitive habitats through impacts on vegetation and aquatic ecosystems.

2.1.2 Dust soiling will arise from the deposition of particulate matter in all size fractions but will be associated mostly with particulate matter with an aerodynamic diameter greater than 30µm.

2.1.3 Exposure to suspended particulate matter can give rise to health effects. Particles with an aerodynamic diameter below 10µm (referred to as 'PM_{10}') correspond to the inhalable fraction of particulate matter. Those with a diameter of less than 2.5µm ('$PM_{2.5}$'), and which form a proportion of PM_{10}, have been shown to give a stronger association with observed ill-effects.

2.1.4 The majority of construction dust is larger than 10µm in diameter and hence the key potential effects are associated with soiling effects.

2.1.5 The following air quality legislation, planning policy and guidance is deemed relevant to the Proposed Development in relation to the above pollutants.

2.2 Legislative Context

Air Quality Strategy

2.2.1 In January 2019 Defra published the **Clean Air Strategy**[2] which outlined a comprehensive suite of actions required across all parts of Government to improve air quality and maximise public health benefits. This included national regulations to reduce emissions from domestic burning, industry and farming, alongside stronger powers, and an improved framework for local government to tackle more localised issues, as well as a commitment to set a legally binding target for $PM_{2.5}$.

2.2.2 Under the Environment Act 1995, as amended by the Environment Act 2021, the UK Government and the devolved executives are required to produce a national air quality strategy ('AQS') every 5 years. The AQS is to provide an over-arching strategic framework for air quality management in the UK setting out a framework to enable local authorities to contribute to long-term air quality goals and setting out standards, objectives, and measures for improving ambient air quality.

[2] UK Government, Clean Air Strategy, published 14 January 2019, https://www.gov.uk/government/publications/clean-air-strategy-2019

2.2.3 In April 2023 the UK Government published the **2023 Air Quality Strategy** ('2023 AQS')[3] which superseded an earlier 2007 AQS (in respect of England only). The 2023 AQS includes previously established standards that have been are set for specific pollutants deemed to pose a risk for human health or other receptors, a number of which were derived from the EU limit and target values, although requirements for compliance varied. The strategy also includes new standards for $PM_{2.5}$ established under the Environment Act 2021 and the Environmental Targets (Fine Particulate Matter) (England) Regulations 2023.

Air Quality Standards for Human Health

2.2.4 Ambient air quality standards in the UK have been established through the combination of transposition of European legislation and additional UK legislation and requirements. This includes suspended particulate matter.

2.2.5 Following the departure of the UK from the EU the air pollution limits established under EU requirements remain in place having been enshrined in UK law, the principal legislation being the Air Quality Regulations 2010 (as amended) which implemented EU Directives 2008/50/EC and 2004/107/EC.

2.2.6 In addition, Part IV of the Environment Act 1995 imposes a duty on local authorities in the UK to review existing and projected air quality in their area. Any location likely to exceed the UK AQOs must be declared an Air Quality Management Area (AQMA) and an Action Plan prepared and implemented, with the aim of achieving the objectives. This process is referred to as Local Air Quality Management (LAQM). The LAQM process is supported by national statutory policy[4] and technical guidance[5] provided by Defra. The standards and objectives relevant to the LAQM framework are prescribed through the Air Quality (England) Regulations 2000.

2.2.7 The pollutants that must be assessed under the LAQM Framework includes PM_{10}, but not $PM_{2.5}$ which is recognised as a regional pollutant for which many sources are outside local authority control. Local authorities are however expected to reduce $PM_{2.5}$ emissions from the sources that are within their control.

2.2.8 The applicable air quality standards relevant to the Site and Proposed Development with regards to protection of human health that are to be achieved are summarised in Table 2.1 below. These are referred to in this report as Air Quality Assessment Levels (AQALs).

[3] Department for Environment, Food & Rural Affairs (2023); The air quality strategy for England.
[4] Defra, Local Air Quality Management, Policy Guidance (PG22), August 2022
[5] Defra, Local Air Quality Management, Technical Guidance (TG22), August 2022

Table 2.1: Air Quality Assessment Levels

Pollutant	AQAL	Averaging period
To be currently achieved		
PM_{10}	40 µg/m^3	annual mean
	50 µg/m^3	24-hour mean, not to be exceeded more than 35 times per annum
$PM_{2.5}$	20 µg/m^3	annual mean
	% reduction relative to average exposure indicator (AEI), dependant on initial concentration; to at least 10 µg/m^3	annual mean
Future standards		
$PM_{2.5}$	12 µg/m^3 (interim target; *to be achieved by 2028)*	annual mean
	reduction in population exposure of 22% compared to 2018 *by 2028*	annual mean
	10 µg/m^3 (legal target; to be achieved by 2040)	annual mean
	reduction in population exposure of 35% compared to 2018 *by 2040*	annual mean

1: $PM_{2.5}$: responsibility for meeting the $PM_{2.5}$ target sits with national government although local authorities have a role in delivering reductions in $PM_{2.5}$

2.2.9 For the purposes of the AQALs ambient air refers to the outdoor air and excludes workplaces where members of the public do not have regular access. Advice is given in Defra guidance[5] as to where the UK AQOs should apply as summarised below:

Table 2.2: Summary of where the AQOs should apply

Averaging period	Locations where the objective should apply
annual mean	all locations where members of the public might be regularly exposed; including façades of residential properties, schools, hospitals, care homes etc
24-hour mean and 8-hr mean	all locations where the annual mean objectives apply together with hotels and gardens of residential properties
1-hour mean	all locations where the annual mean, 24-hour and 8-hour means apply; also kerbside Sites, parts of car parks, bus stations and railway stations which are not fully enclosed and any outdoor locations where members of the public might reasonably be expected to spend 1 hour or longer.
15-min mean	all locations where members of the public may be reasonably exposed for a period of 15 minutes.

Note: the AQOs do not apply at building façades or other places of work where members of the public do not have regular access

Ambient Dust Standards and Control

2.2.10 Deposition dust as such is not regulated as a pollutant under the above requirements. There are no UK statutory or recommended levels that define the point when deposited dust causes annoyance or disamenity ('disamenity dust') although standard 'custom and practice' thresholds are referred to.

2.2.11 Public concerns in relation to dust accumulation and soiling may be related to a range of factors including the nature of a site and locality and baseline levels. Controls of soiling and annoyance impacts are typically achieved through conditions within planning permissions and / or environmental permits requiring the implementation of a dust management plan to prevent amenity impacts. Deposited dust may also give rise to 'nuisance', as Statutory, private, and public nuisance as defined in environmental law and insofar as nuisance relates to unacceptable effects of emissions.

2.3 Planning Policy

National Planning Policy and Guidance

2.3.1 The following National Policy Statements set out national planning policies in relation to nationally significant solar photovoltaic generation developments and electricity networks:

- Overarching National Policy Statement for Energy (EN-1)[6]; and
- National Policy Statement (NPS) for Renewable Energy Infrastructure (EN-3)[7];
- National Policy Statement (NPS) for Electricity Networks Infrastructure (EN-5)[8].

2.3.2 The **National Planning Policy Framework (NPPF)[9]**, and the accompanying online **Planning Practice Guidance (PPG)[10]** are also important and relevant but are not the key policy documents against which the application will be determined.

[6] Department for Energy Security & Net Zero, Overarching National Policy Statement for Energy (EN-1), November 2023
[7] Department for Energy Security & Net Zero, National Policy Statement for Renewable Energy Infrastructure (EN-3), November 2023
[8] Department for Energy Security & Net Zero, Overarching National Policy Statement for Electricity Newtorks Infrastructure (EN-5), November 2023
[9] Ministry of Housing, Communities and Local Government, National Planning Policy Framework, issued, March 2012, last updated 7th February 2025
[10] Ministry of Housing, Communities and Local Government, Planning Practice Guidance: Air Quality, issued March 2014, last updated 1st November 2019

2.3.3 Relevant sections of these policies in relation to construction dust are:

Table 2.3: Summary of National Planning Policy

Document	Policy / Paragraph Reference	Summary of Policy / Paragraph
NPS EN-1	Section 5.2	In relation to Air Quality and Emissions.
	Section 5.4	In relation to air quality and emissions impacts on biodiversity and nature conservation.
	Section 5.7	In relation to Dust, Odour, Artificial Light, Smoke, Steam, and Insect Infestation.
NPS EN-3	Section 2.10	In relation to Solar Photovoltaic Generation; no specific sub-sections relating to air quality and emissions.
NPS EN-5	Sections 2.9 and 2.19	In relation to applicant assessment; no specific sub-sections relating to air quality and emissions
NPPF	Para. 180	Sets out that planning policies and decisions should prevent new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of air pollution. Development should, wherever possible, help to improve local environmental conditions such as air quality.
	Para. 191	Sets out that planning policies and decisions should work to ensure new developments are appropriate for the location with respect to the effects of the development and the sensitivity of the area.
	Para. 192	Sets out that planning policies and decisions should sustain and contribute to compliance with relevant limit values and national objectives for pollutants, taking into account AQMAs, Clean Air Zones, and cumulative impacts. Opportunities for air quality improvement or impact mitigation should be identified and considered when making planning decisions. Development should be consistent with local Air Quality Action Plans.
PPG	PPG-AQ	Provides guiding principles on how planning can take account of the impact of new development on air quality.

2.3.4 Defra is developing guidance for developers and planning authorities on how to consider the new legal air quality targets for $PM_{2.5}$ in planning decisions. A consultation on the new approach and guidance is expected to be published in 2025. In the meantime, Defra has issued interim guidance to provide developers and planning authorities with clarity on how to consider the new targets whilst the full guidance is under development[11].

2.3.5 The interim guidance sets out that whilst achievement of the targets will be assessed at relevant monitoring sites across the UK, the targets apply to ambient air across the UK. Applicants and

[11] Department for Environment, Food and Rural Affairs, $PM_{2.5}$ Targets: Interim Planning Guidance, undated

Local Planning Authorities should therefore consider the impact of developments on air quality in all ambient air, whether or not a monitor is in place. The interim guidance sets out a series of questions to be used as prompts to support the interim process.

2.3.6 No further specific guidance is currently provided in the NPPF or PPG-AQ. In assessing the risks posed by dust by new development, reference is therefore made to non-statutory guidance issued by the IAQM as detailed below.

Local Planning Policy

2.3.7 The **Cheshire West and Chester Local Plan (Part One) Strategic Policies** document[12], adopted 29th January 2015, sets out a number of planning policies and proposals to control development over future years.

2.3.8 **Policy ENV 7** on **Alternative Energy Supplies** from the Strategic Policies document states:

"The Local Plan will support renewable and low carbon energy proposals where there are no unacceptable impacts on:

- *Landscape, visual or residential amenity*
- *Noise, air, water, highways, or health*
- *Biodiversity, the natural or historic environment*
- *Radar, telecommunications, or the safety of aircraft operations*

Proposals should be accompanied by appropriate arrangements for decommissioning and reinstatement of the site when its operational lifespan has ended…"

2.4 National Best Practice and Guidance

2.4.1 The IAQM **Guidance on the Assessment of Dust from Demolition and Construction**[1] provides specific non-statutory guidance in relation to dust and emissions from construction and demolition. Parts of this guidance may also be applied to importation and restoration activities where these present similar risks of impacts, and the relevant guidance is referred to concerning mitigation measures.

[12] Cheshire West and Chester Council, Cheshire West and Chester Local Plan (Part One) Strategic Policies, adopted 29th January 2015

3 Assessment Methodology

3.1 Scope

3.1.1 This assessment considers the potential effects of deposition dust and suspended particulate matter (PM_{10} and $PM_{2.5}$) arising during construction activities.

3.1.2 In undertaking the Construction Dust Assessment, the following activities have been carried out:

- review of baseline air quality and local weather conditions;
- review of background site sensitivity data and nature conservation sites;
- qualitative assessment of potential dust / airborne particulate matter impacts;
- provision of recommendations for mitigation measures;
- assessment of residual impacts on human and ecological receptors and significance of effects.

3.2 Sources of Information

3.2.1 The baseline data has been gathered through a desk top study and the site visit. In undertaking the assessment reference has been made to the following sources of information:

Table 3.1: Information Sources

Date and Reference	Author and Source	Purpose and Content
Background and Topographical Information		
Promap	Ordnance Survey	general mapping information including topographic data, ground features, rights of ways, communications etc
Aerial satellite imagery; imagery date May 2023 and earlier	aerial photography (various)	site setting
https://magic.defra.gov.uk/	multi-agency	web-based interactive map containing information on nature conservation areas
Air Quality Information		
2024 Air Quality Annual Status Report (ASR), June 2024[13] *(and earlier reports)*	Cheshire West and Chester Council (CWCC)	Update of local authority air quality monitoring and assessment; details air quality data up until end 2023
https://uk-air.defra.gov.uk/aqma/	Defra	Details and maps of AQMAs throughout UK
https://laqm.defra.gov.uk/	Defra	Local Authority air quality management support; background pollutant maps

Note: all information websites were accessed in March 2025

[13] Cheshire West and Chester Council, 2024 Air Quality Annual Status Report (ASR), June 2024

3.2.2 Information on ecological sites has been provided by the project ecological consultant, Avian Ecology.

3.3 Assessment Methodology

3.3.1 The assessment of potential impacts and resulting effects associated with fugitive dust arising from the construction phase has been undertaken in accordance with the approach described in the IAQM guidance in relation to construction dust[1]. The guidance sets out methodologies for assessing potential impacts from dust soiling and increased ambient PM_{10} concentrations arising from construction activities; provides recommended mitigation measures for different scale developments; and outlines approaches to assessing the overall significance of effects.

3.3.2 An 'impact' is described as a change in pollutant concentration or dust deposition, while an 'effect' is described as the consequence of an impact.

3.3.3 The assessment of potential pollutant impacts uses the source-pathway-receptor concept and considers the potential magnitude of a release (the source potential), the effectiveness of the pathway (i.e., dispersion of a pollutant towards a receptor), and the sensitivity of the receptor.

3.3.4 The assessment considers the location of the Proposed Development in relation to sensitive receptors, and the control measures to be implemented, to assess the probability of significant adverse air quality impacts occurring during construction works. Consideration is made of the orientation and distance of receptors to the Site and the prevailing weather conditions.

3.3.5 Receptors considered in this Construction Dust Assessment are:

- human receptors: that is locations where a person or property may experience adverse impacts of airborne dust (i.e., residential, leisure, amenity, and sensitive commercial use); and,
- ecological receptors: where this refers to any sensitive habitat that may be affected by dust soiling (e.g., locations with an international, national, or local designation and sensitive habitat features).

3.3.6 The IAQM guidance on construction dust[1] provides the following screening criteria for where a Construction Dust Assessment would normally be required:

- A 'human' receptor within:
  - 250m from the boundary of a site and / or,
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from a site entrance(s).
- An 'ecological' receptor within:
  - 50m from the boundary of a site and / or,

- 50m of the route(s) used by construction vehicles on the public highway, up to 250m from a site entrance(s).

3.3.7 These screening criteria have been refined taking into the account the specific nature of the Proposed Development as discussed below in Section 4.

3.3.8 Further details on the selection of receptors and the methodology of the assessment as detailed in the relevant guidance is described in Appendix A.

3.3.9 The assessment has informed appropriate mitigation measures to be employed during the construction phase and which are to be included within the oCEMP. If the DCO is granted, the oCEMP will be developed into a full Construction Environmental Management Plan (CEMP) once a contractor is appointed. The full plan must be in substantial accordance with the outline and will require approval by CWaCC. The Proposed Development must be undertaken in accordance with the approved plan. This is secured via a Requirement in Schedule 2 of the draft DCO [EN010153/DR/3.1].

4 Site Details and Proposed Development

4.1 Introduction

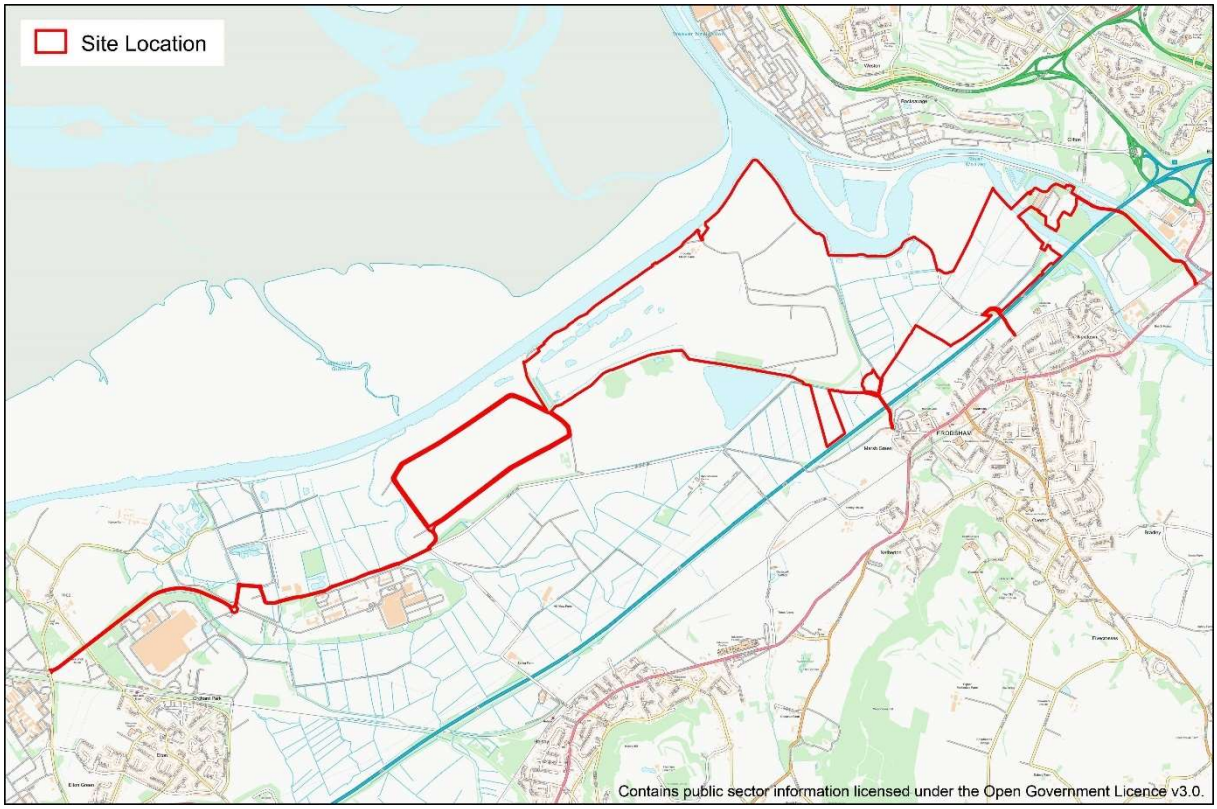
4.1.1 Full details on the site location and Proposed Development are provided within **ES Vol 1 Chapter 1: Introduction [EN010153/DR/6.1]** and **ES Vole 1 Chapter 2: The Proposed Development [EN010153/DR/6.1]** and accompanying figures **ES Vol 3 Figures [EN010153/APP/6.3].** Only matters of direct relevance to inform the Construction Dust Assessment are summarised below.

4.2 Site Details

4.2.1 The Site is located within Frodsham Marshes directly south of the Manchester Ship Canal and generally southwest of the River Weaver, about 500m to the north/northwest of the village of Frodsham. It is defined by a single red line boundary (the 'Order Limits') that covers all land expected to be included within the Proposed Development and is shown on **ES Volume 3 Figure 1-1 Site Location *[EN010153/APP/6.3].*** The Order Limits encompass all of the principal limits of the Proposed Development extending in total to approximately 337.5 ha.

4.2.2 The Site location is shown below in Figure 4.1.

Figure 4.1: Site Location



Reproduced from ES Volume 3 Figure 1-1: Site Location [EN010153/APP/6.3].

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4.3 Proposed Development

4.3.1 The Proposed Development comprises a new solar energy generating station and an associated on-site Battery Energy Storage System (BESS) along with associated infrastructure for connection to the local electricity distribution network, and a private wire electricity connection. The indicative proposed layout (which forms a reasonable worst case) is provided in **ES Vol 3 Figure 2-2: Indicative Operational Site Layout [EN010153/DR/6.3].**

4.3.2 Principal elements of the Proposed Development include:

- **Solar Array Development Area ('SADA')** – which would include solar photovoltaic modules and support frames, internal access tracks, cabling, inverters, transformers, the solar array substation (known as the 'Frodsham Solar Substation') and the BESS;
- **Main Site Access** – which would be routed from the west via the Pool Lane roundabout to the access tracks used for the Frodsham Wind Farm. There would be no access to the Site from Frodsham during construction other than for emergency vehicles, and access to a newly proposed public car parking area on Moorditch Lane;
- **SPEN Grid Connection** – which would link the on-site Frodsham Solar Substation to the Scottish Power Energy Networks ('SPEN') / National Grid Frodsham Substation;
- **SPEN / National Grid Frodsham Substation** – which is included along with access into the substation in order to provide the Grid Connection;
- **Private Wire Connection** – which includes land to facilitate future electricity connections to businesses located south-west of the Proposed Development; to run along existing tracks;
- **Non-Breeding Bird Mitigation Area ('NBBMA')** – which includes land that would be used to mitigate for the potential impacts of the Proposed Development on wetland bird species; and
- **Skylark Mitigation Area** – which includes land that would be used to mitigate for the potential impacts of the Proposed Development on skylark.

4.3.3 The SADA is the principal component of the Proposed Development and would comprise the Western Array and Eastern Array. It would be located at the eastern end of Frodsham Marshes, between the Mersey Estuary and the M56. The northern boundary of the SADA is formed by the River Weaver, and the north-western boundary by the Manchester Ship Canal, with the Mersey Estuary lying beyond. The western boundary of the SADA is formed by two of the former Manchester Ship Canal Dredging Deposit Cells (Cell 4 and Cell 6). The southern boundary of the SADA is formed by agricultural fields and the M56 motorway

4.3.4 Access to the Site will be gained by pre-existing roadways and tracks. The Main Site Access runs from the west, leaving the public highway at the Pool Lane roundabout. From the roundabout vehicles would travel about 1.5km along Grinsome Road (a private road), then along Road 1 of Protos and Marsh Lane to the existing Frodsham Wind Farm access tracks. These access tracks would provide access to the SADA. Minor improvement works would be required to the existing wind farm tracks but no significant construction works would be required to facilitate access.

4.3.5 Grinsome Road, Road 1 Protos and the initial stretch of Marsh Lane are fully bound (provided with tarmac and / or concrete surfacing). The 1.2km stretch of Marsh Lane from the eastern extent of Protos to the Frodsham Wind Farm access tracks is provided with unbound surfacing (compacted aggregate).

4.3.6 Internal access tracks would be required for the construction and operation of the SADA. This would be achieved through a combination of using existing Frodsham Wind Farm access tracks and construction of new permanent and temporary tracks.

4.3.7 The access to the SPEN / National Grid Frodsham Substation will be via the A56 Chester Road, where an existing dedicated private access road leads to the substation complex.

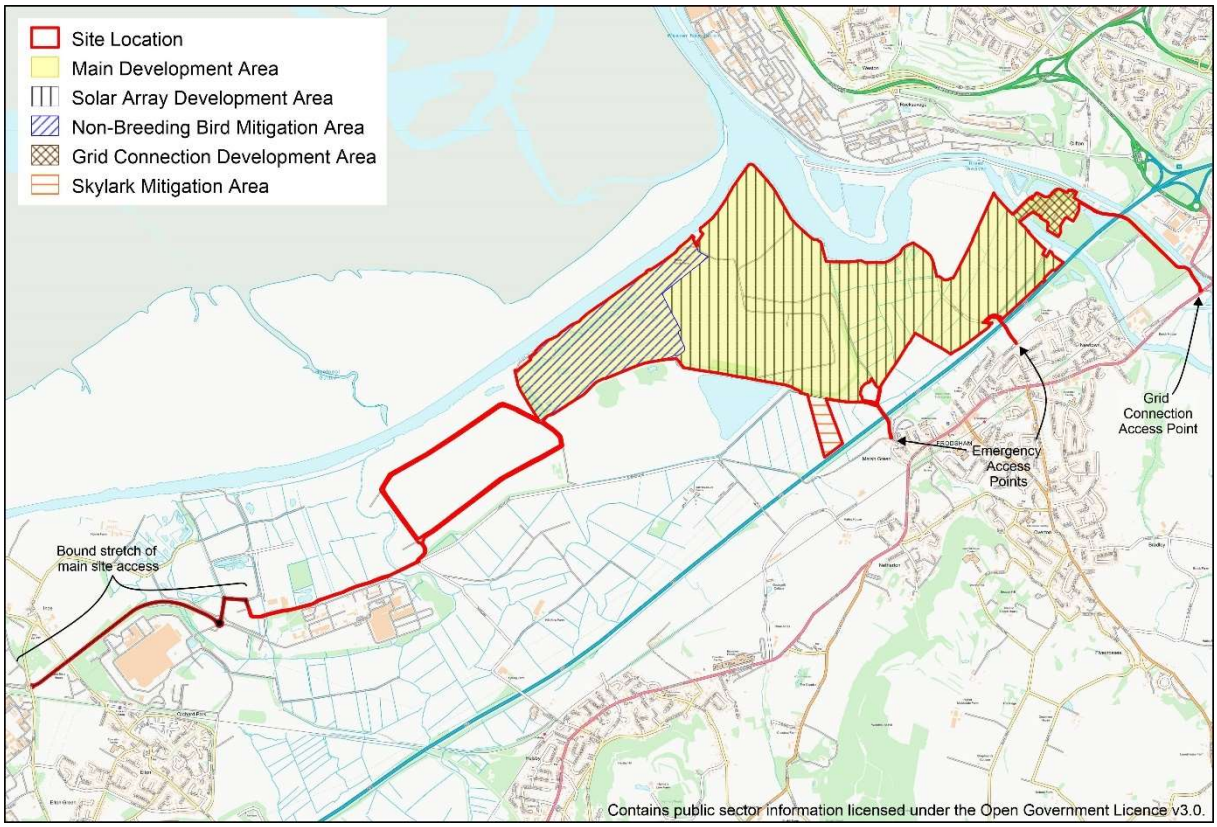
4.3.8 Two emergency access routes are included within the Order Limits from Frodsham via Brook Furlong and Marsh Lane, and Weaver Lane. These however would only be used by emergency service vehicles and not by any construction related vehicles including staff vehicles.

4.3.9 The NBBMA covers an area of about 64ha located within the area of Cell 3 of the former Manchester Ship Canal Dredging Deposit Grounds. It is immediately west of the SADA. The NBBMA would be created through re-engineering of Cell 3 to provide an improved habitat for birds associated with the adjoining Mersey Estuary Special Protection Area (SPA) and Ramsar site. This will involve lowering ground levels and sculpting of landforms to provide wet grassland areas, scrapes and infilling of the ponds in the surrounding area (located directly north and west of the Manchester Ship Canal Dredging Deposit Ground MSCDDG Cell 3).

4.3.10 No physical works are proposed within the Skylark Mitigation Area.

4.3.11 For the purposes of this Construction Dust Assessment the areas of the SADA, NBBMA and SPEN Frodsham Substation (and SPEN Grid Connection) have been referred cumulatively as the ‘Main Development Area’, as shown in Figure 4.2.

Figure 4.2: Site Areas



4.4 Construction Phasing

4.4.1 The construction of the Proposed Development is likely to be split into different sub-projects / packages to enable the development to be delivered in the most efficient manner with the overall construction phase lasting approximately 30 months. These are detailed in the **ES Volume 2 Appendix 2-2 Indicative Construction Phasing and Resource Schedule *[EN010153/APP/6.2].***

4.4.2 As a result, there could be multiple CEMPs which would be developed for those different phases. These would all be prepared in substantial accordance with overarching oCEMP.

4.4.3 The primary indicative construction stages are summarised below. However, many of the activities associated with each stage would occur in parallel due to the scale of the Proposed Development:

i) Construction of the NBBMA;
ii) Enabling Works;
iii) Construction of the Western SADA;
iv) Construction of the Eastern SADA;
v) Construction of the BESS and Frodsham Solar Substation;
vi) Construction of the 132 kV SPEN Substation Grid Connection;
vii) Construction of the 132 kV Private Wire Grid Connection.

4.4.4 The construction of the NBBMA would need to be completed prior to commencing construction of the Western Array. As such, this phase is expected to be undertaken as preliminary works ahead of the main construction period. This phase is expected to take 6 months.

4.4.5 It is anticipated that there will be two main construction compounds and four smaller secondary compounds to facilitate the construction works within the SADA. There will also be a dedicated construction compound for the NBBMA works within Cell 3, located at the western end of the Cell to reduce impacts (including air quality) on Cell 2 during the creation of the NBBMA. Two additional compounds will be provided to the north of the River Weaver for the purposes of the SPEN Grid Connection works.

4.4.6 There is predicted to be an average of 16 two-way delivery related HGV movements per weekday (8 in / 8 out) and 8 on Saturdays (4 in / 4 out) between the Main Site Compounds and the Main Site Access across the construction phase. HGV movements are expected to peak at up to 57 two -way movements per weekday and 28 on Saturdays with these occurring in Month 6.

4.4.7 There is predicted to be an average of 110 two-way staff related movements (LGVs) per day (55 in / 55 out) to / from the Main Site Compounds and the Main Site Access across the construction phase. LDV movements are expected to peak at up to 144 two -way movements per day with these occurring in Month 15.

5 Site Context and Baseline Assessment

5.1 Site Context

5.1.1 The key aspects of the Site's context which are of relevance to the Construction Dust Assessment are summarised as follows.

5.1.2 The nearest residential use to the Main Development Area is at two residential caravan sites located off Brook Furlong to the north-west of Frodsham (north of the M56). These lie adjacent to the SADA. Both sites have been developed without planning permission.

5.1.3 Other residential use within 250m of the Main Development Area comprises properties within the community of Frodsham beyond the M56 to the south / south-east. Properties on Hawthorn Road and Wayford Mews extend to within 140m. Other properties within 250m of the SADA include those on Williams Way (230m distant).

5.1.4 Frodsham Primary Academy School lies 150m to the south of the SADA on the outskirts of Frodsham. Open ground located between the M56 and the school buildings is presumed to form part of the grounds associated with the school. Playing fields, a play-ground and a fishing pond lie to the east of the school.

5.1.5 There are a number of Public Rights of Way (PRoW) which either cross the Site or pass close to the Site. A national cycle route runs along a section of the Main Site Access and along part of the southern edge of the Site.

5.1.6 There are no residential or other sensitive human receptors within 50m of the Main Site Access, other than the two caravan sites.

5.2 Nature Conservation Sites

Statutory Designated Sites

5.2.1 The Mersey Estuary to the north of the Site is designated as a Site of Special Scientific Interest (SSSI), Special Protection Area (SPA), and Ramsar site. The areas lying within the Mersey Estuary SPA and Ramsar designations extend to 72m of the Site at the closest point. These lie outside the screening threshold distance of 50m set out in the IAQM guidance (see paragraph 3.3.6).

5.2.2 The area encompassed by the SSSI designation also includes a strip of land approximately 100m wide on the southern side of the Manchester Ship Canal, the eastern stretch of which lies within the NBBMA within the Site and so these areas are within the 50m screening threshold distance. Terrestrial ecological features for which the Mersey Estuary SSSI is designated for comprise saltmarsh and boulder clay cliffs; however, neither of these habitats are present within the Main Development Area.

5.2.3 Cells 1, 2 and 5, which form part of the SADA, are classified as Functionally Linked Land (FLL); whilst not part of the designated Mersey Estuary SPA, they are considered to contribute to the functionality and integrity of the designated site.

Non-Statutory Designated Sites

5.2.4 The SADA, NBBMA, Skylark Mitigation Area and stretches of the Main Site Access all lie within the Frodsham, Helsby and Ince Marshes Local Wildlife Site (LWS), as does extensive land to the west. The SPEN / National Grid Substation lies within the Frodsham Field Studies Centre LWS.

5.2.5 Other non-statutory designated nature conservation sites within 250m of the Main Development Area are:

- Clifton lagoon LWS – 0.07km to the east,
- Upper Mersey Estuary LWS – 0.30km to the north,
- Easton Clifton Tip LWS – 0.6m to the northeast,
- Sutton Bridge Unused Lagoon – 0.1km to the southeast
- Weston Marsh Lagoon LWS – 0.12km north,
- Clifton Cloughs Ancient Woodland – 0.29km to the northeast,

5.2.6 For further details on these statutory and non-statutory designated sites reference should be made to **ES Vol 1 Chapter 7: Terrestrial Ecology [EN010153/DR/6.1]and ES Vol 1 Chapter 8: Ornithology [EN010153/DR/6.1]**.

5.3 Air Quality Management Areas (AQMAs)

5.3.1 The Proposed Development is located within the administrative area of Cheshire West and Chester Council (CaWCC) with regards to local air quality and environmental health.

5.3.2 CaWCC has two current declared AQMAs within its' administrative area, two previously declared AQMAs having been revoked in 2024. Of these current and historic AQMAs, only the Thornton-le-Moors AQMA lies within the 250m of the Site. The AQMA has been declared due to exceedances of the 15-minute sulphur dioxide (SO_2) objective due to industrial emissions. The AQMA is located to the west of the Site and an area of this AQMA extends to within 80m of the

Site boundary, close to the western most part of the Main Site Access at the Pool Lane / Grinsome Road roundabout. However, this AQMA is not of relevance to the Construction Dust Assessment which is concerned with dust and suspended particulate matter (PM_{10}). Furthermore, the construction and operational traffic associated with development would also not have a material impact on the objectives of the AQMA as traffic emissions are not a significant contributing factor to the pollutant of concern, SO_2, due to the low levels of sulphur in road vehicle fuel. The presence of the oil refinery at Stanlow is likely to be the key contributor.

5.3.3 A former AQMA encompassed an area within Frodsham and extended to about 520m to the south-east of the Site. This AQMA had been declared due to the traffic-related NO_2 emissions. It was revoked in 2014 following annual mean NO_2 levels to be consistent below the AQO. Again, this AQMA is not of relevance to the Construction Dust Assessment which is concerned with dust and suspended particulate matter (PM_{10}).

5.3.4 The other two current / former AQMAs declared by CWaCC are distant from the Site and have not been declared to due to particulate matter.

5.3.5 The adjoining Halton Borough Council (HBC) has not declared any AQMAs due to particulate matter.

5.4 Monitored Local Air Quality

5.4.1 CaWCC undertakes ambient air quality monitoring for PM_{10} using automatic (continuous) analysers at three locations within its area. None of these monitoring sites are within 250m of the Site boundary. However, data from the Frodsham and Thornton-le-Moors monitoring sites have been referred to provide background information on the wider local ambient air quality. The third monitoring location sited within Chester City Centre and does not provide data considered to be of relevant to this assessment.

5.4.2 CWaCC does not undertake monitoring for $PM_{2.5}$. The Council instead uses the approach detailed in technical guidance provided by Defra[5] to estimate probable local $PM_{2.5}$ levels by considering the ratio of the two fractions of particulate matter.

5.4.3 HBC dos not currently undertake any ambient air quality monitoring for PM_{10} or $PM_{2.5}$ previously operated continuous analysers having been decommissioned in 2023.

5.4.4 Information on the Frodsham and Thornton-le-Moors monitoring locations is provided below in Table 5.1. The monitoring locations are shown in Figure 5.1.

Table 5.1: Nearest PM Monitoring Locations to the Site

ID	Location	Grid Reference	Type	Distance & Orientation from Site
FMH	Frodsham	352445, 378031	Urban Background	770m S
TLP	Thornton-le-Moors, Park Road	344103, 374330	Industrial	5.84km SW

Data as presented in the CaWCC 2024 ASR (and earlier reports)

5.4.5 Results from the monitoring at these locations for 2018-2023 are summarised below in Tables 5.2 and 5.3.

Table 5.2: Nearest PM Monitoring Locations – Annual Mean PM_{10} Concentrations

ID	Annual Mean PM_{10} Concentration ($\mu g/m^3$)					
	2018	2019	2020*	2021*	2022	2023
FMH	16	15	12	13	15	13.6
TLP	13	14	13	13	13	11.9

Data as presented in the CaWCC 2024 ASR (and earlier reports)
Highlighted cells are in exceedance of the current air quality objective (40 $\mu g/m^3$ as an annual mean).
*Concentrations recorded in 2020 and 2021 expected to be affected to an extent by implications of Covid-19 pandemic[14]
All results bias adjusted and annualised as appropriate.

Table 5.3: Nearest PM Monitoring Locations – Number of Daily Mean PM_{10} Concentrations > 50 $\mu g/m^3$

ID	Annual Mean PM_{10} Concentration ($\mu g/m^3$)					
	2018	2019	2020*	2021*	2022	2023
FMH	0	1	0	0	2	0
TLP	0	3	0	0	0	0

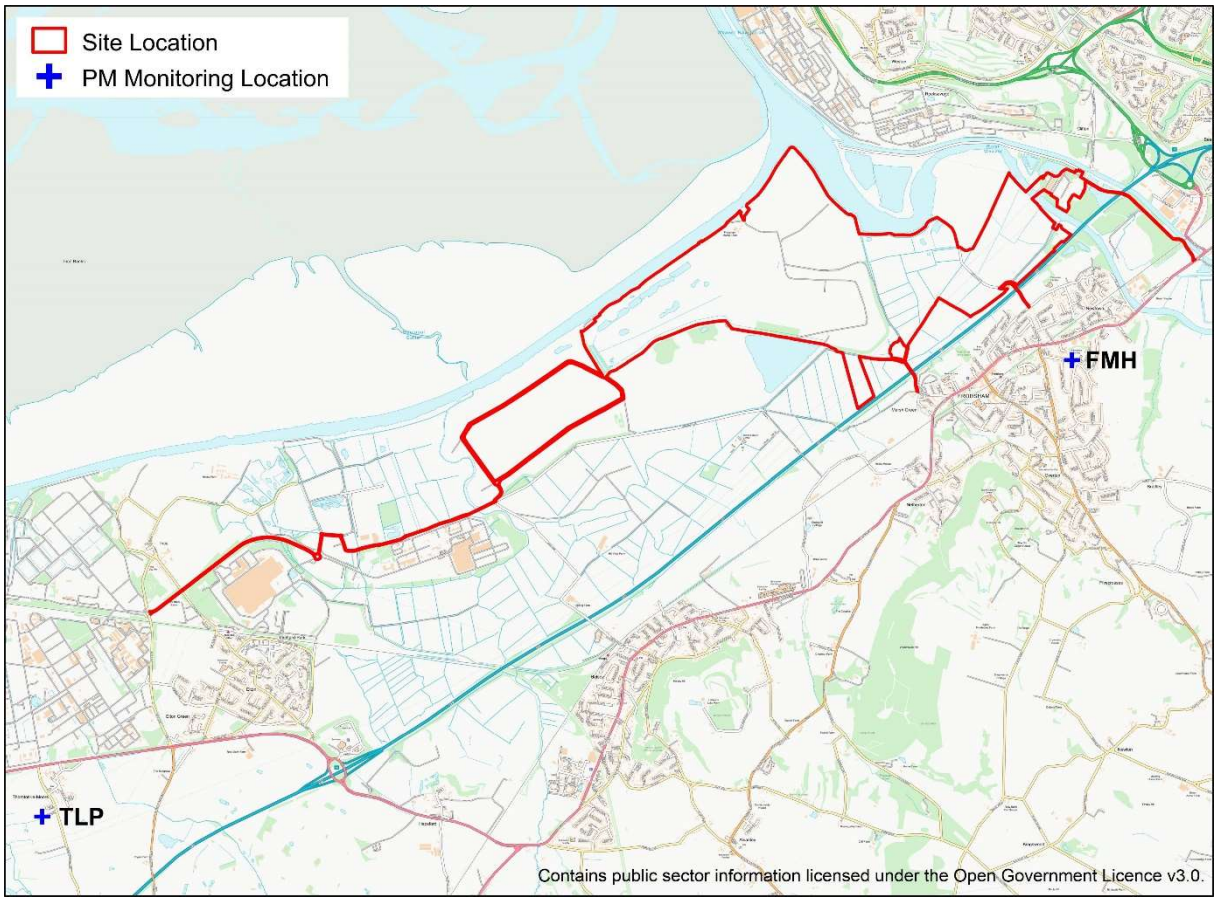
Data as presented in the CaWCC 2024 ASR (and earlier reports)
Highlighted cells are in exceedance of the current air quality objective (50 $\mu g/m^3$ as a 24-hour mean not to be exceeded more than 35 times per year).
*Concentrations recorded in 2020 and 2021 expected to be affected to an extent by implications of Covid-19 pandemic
All results bias adjusted and annualised as appropriate.

5.4.6 As shown in the above tables, there were no exceedances of the daily mean PM_{10} objective or annual mean PM_{10} objective recorded at either the Frodsham or Thornton-le-Moors monitoring location.

5.4.7 CWaCC estimated 2023 annual mean $PM_{2.5}$ concentrations for 2023 at Frodsham (FMH) at 8.9 $\mu g/m^3$. Calculations were not included for the Thornton-le-Moors site due to it being characterised as industrial.

[14] COVID-19: Following the outbreak of a global pandemic of the Coronavirus disease 2019 (COVID-19) due to the SAR-CoV-2 virus, the UK Government declared several restrictions on non-essential travel and movement during March 2020. Various restrictions remained in place during 2020 and 2021 with resulting implications on transport movements across the UK

Figure 5.1: Monitoring Locations



5.5 Background Air Quality Data

5.5.1 Defra publishes predicted background pollutant concentration maps for 1km x 1km grid squares across the UK. These are updated periodically due to updates in background data including vehicle emissions factors and the age and distribution of the UK vehicle fleet. The current maps were issued in 2024 and the predicted data is based on 2021 ambient monitoring and meteorological data. Predicted data is provided by Defra for each year from 2021 to 2040.

5.5.2 Predicted PM_{10} and $PM_{2.5}$ data for the grid squares in which the Site and nearest receptors are located for the current year (2025) and the expected construction completion year (2029) are detailed in the tables below.

Table 5.3: Predicted Background Air Quality Data – Particulate Matter

Grid Square	Location	Annual Mean Pollutant Concentration (µg/m³)			
		2025		2029	
		PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
352500 379500	Substation Area / Main Development Area	13.17	6.57	12.87	6.29
352500 378500	Main Development Area	13.20	6.83	12.88	6.54
351500 379500	Main Development Area	11.31	6.22	11.00	5.94

Grid Square	Location	Annual Mean Pollutant Concentration (µg/m^3)			
		2025		2029	
		PM_{10}	$PM_{2.5}$	PM_{10}	$PM_{2.5}$
351500 378500	Main Development Area	14.14	6.64	13.84	6.36
350500 379500	Main Development Area	10.66	6.09	10.36	5.81
350500 378500	Main Development Area	10.89	6.05	10.59	5.77
349500 379500	Main Development Area	9.99	5.97	9.67	5.68
349500 378500	Main Development Area	10.19	5.94	9.87	5.66
348500 378500	NBBMA	10.29	6.04	9.97	5.76
348500 377500	NBBMA	11.25	6.18	10.93	5.90

Data downloaded in March 2025
(v) – established for the protection of vegetation
1: Interim target of 12 µg/m^3 for $PM_{2.5}$ for 2028

5.5.3 The average background concentrations for the grid squares in which the Site is located are predicted to be well below the relevant objectives in 2025 and 2029.

5.5.4 It should be noted that the data are effectively an average concentration across each 1km square. Pollutant concentrations will therefore be higher at any individual receptor close to any significant source.

5.6 Wind Speed and Direction

5.6.1 The most important meteorological parameters governing the atmospheric dispersion of pollutants are:

- wind direction: determines the broad direction of the transport of the emission;
- wind speed: affects the ground levels concentrations by determining the initial dilution of pollutants emitted;
- atmospheric stability: a measure of atmospheric turbulence and hence dispersion of pollutants.

5.6.2 Reference has been made to wind speed and direction data obtained from the meteorological station at Liverpool Airport (NGR: 422391, 441141; 24m AOD) about 6km to the north-west. Windspeed and direction data has been provided by ADM Ltd, a recognised supplier of meteorological data, for the years 2014-2023. Local variations will exist in meteorological conditions but given the nature of the local topography and setting the use of data from Liverpool Airport is considered appropriate for this assessment and is consistent with air quality assessments prepared for the other planning applications for this locality.

5.6.3 The annual wind rose derived from the data is provided in Figure 5.2. This depicts average wind speeds and directions over the relevant total monitoring period.

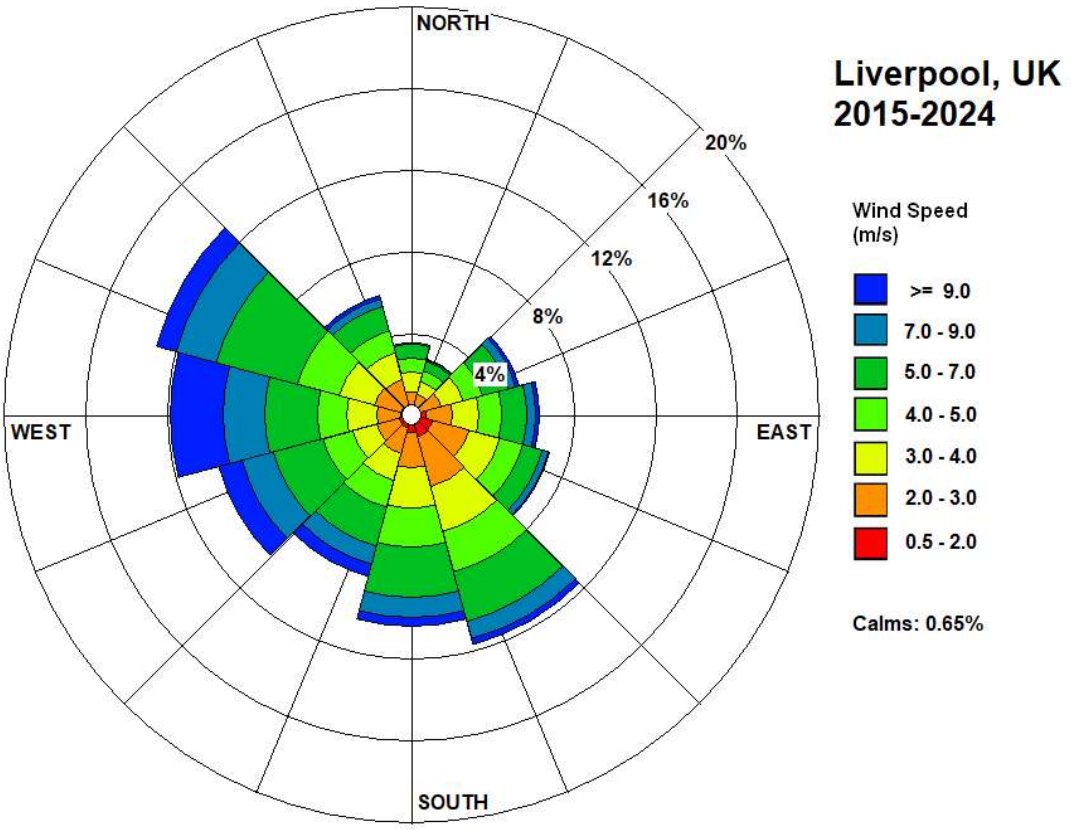
5.6.4 The frequency of winds blowing from each sector are summarised in Table 5.10.

Table 5.10: Summary Wind Data, Liverpool Airport (2015-2024)

Direction		Annual Percentage Frequency (%)	
		All Wind Speeds	Wind Speeds >5 m/s
0º	*(346 to 15)*	3.56	0.74
30º	*(16 to 45)*	2.83	0.56
60º	*(46 to 75)*	5.46	1.80
90º	*(76 to 105)*	6.27	1.82
120º	*(106 to 135)*	7.01	1.36
150º	*(136 to 165)*	11.64	3.65
180º	*(166 to 195)*	10.36	3.38
210º	*(196 to 225)*	8.19	3.47
240º	*(226 to 255)*	9.76	5.27
270º	*(256 to 285)*	11.81	7.18
300º	*(286 to 315)*	12.92	7.14
330º	*(316 to 345)*	6.04	1.76
		100	**38.66**

5.6.5 The windroses show the prevailing wind direction in the area to be variable, with the prevailing wind direction tending to be south-easterly through to north-westerly, consistent with influences of the nearby Mersey Estuary.

Figure 5.2: Annual Windrose for Liverpool (years 2015-2024)



6 Construction Dust Assessment

6.1 Introduction

6.1.1 The Proposed Development will require earthworks and construction works. There will not be any demolition works.

6.1.2 Airborne dust is raised when fine particles are disturbed and loosened by physical activity such as breaking, excavating, loading, tipping, and transport. Additionally airborne dust can be generated by an airstream passing over such materials and it is generally accepted that wind speeds greater than about 5 m/s across loose fine materials can cause windblown dust emissions.

6.1.3 Light winds will transport fine particles already suspended in the atmosphere due to disturbance. In calm conditions, any raised dust tends to settle out in the vicinity of the source. In windier conditions the dust may be carried for a greater distance before settling out. The distance the dust will be carried depends on the wind speed, the particle size of the dust, the topography of the site and its surroundings.

6.1.4 Large dust particles, greater than 30 µm, which constitute the greatest proportion of dust emitted from earthworks and construction activities, will largely deposit within 100 m of the source[1]. Finer particles, which constitute a small proportion of the dust emitted from most operations, are only deposited slowly, although their concentrations decrease rapidly from the source due to dispersion and dilution.

6.1.5 The principal sources of airborne dust associated with the earthworks and construction across the Site include:

- Site clearance and preparation, including soil stripping (SADA and NBBMA);
- Preparation and construction of temporary and permanent internal access tracks and temporary construction compounds within the SADA;
- Earthworks within the NBBMA;
- Earthworks to include foundation and trench excavation works and subsequent backfilling (within the SADA and Grid Connection);
- Materials handling, storage and stockpiling;
- Internal traffic movements and haulage:
- Vehicle movements along unbound stretches of the Main Site Access to / from construction compounds and car parking areas;
- Off-road vehicle movements (NRMM) between construction compounds and wider construction areas across the Site;
- Construction of Solar PV Array, buildings and areas of hardstanding;
- Wind-blow across bare surfaces and stockpiles;
- Site landscaping and provision of Green Infrastructure, to include soil placement.

6.2 Assessment

6.2.1 As discussed above the Order Limits include the Main Site Access where this includes Grinsome Road, Road 1 of Protos and Marsh Lane to / from the existing Frodsham Wind Farm access tracks. It is a further 3.5km from the start of the Frodsham Windfarm Access tracks to the western most Main Compound (that serving the NBBMA and forming the nearest to the exit from the public highway). Overall this provides a length of at least 4km of unbound access track from the exit from the main working area onto Marsh Lane and then a further 1.5km of bound access road to the exit onto the public highway.

6.2.2 For the purposes of the dust assessment therefore the Dust Assessment Area has been taken as within 250m of the Main Development Area i.e the SADAs, NBBMA, BESS and SPEN Grid Connection, and 250m of the unbound stretch of the access road / track, rather than the entire area of the Site. The Dust Assessment Area is shown in Figures 6.1 and 6.2.

6.2.3 The assessment takes into account the physical in-design measures incorporated within the Proposed Development. These include:

- use of existing fully paved access roads from the public highway for a distance of at least 1.8km;
- use of existing internal Frodsham Wind Farm Access Roads to provide access to the NBBMA and Solar Array Development Areas; all formed of compacted stone and to be subject to minor improvement works prior to on-set of construction works;
- provision of secondary construction compounds in addition to the two Main Construction Compounds to minimise internal haulage;
- majority of above ground structures to be of modular, prefabricated or containerised design, including the BESS Control Building and Battery Transformer / Invertor Containers;
- concrete supports for PV Array to be pre-fabricated off-site further minimising on-site construction works.

Figure 6.1: Construction Dust Assessment Area

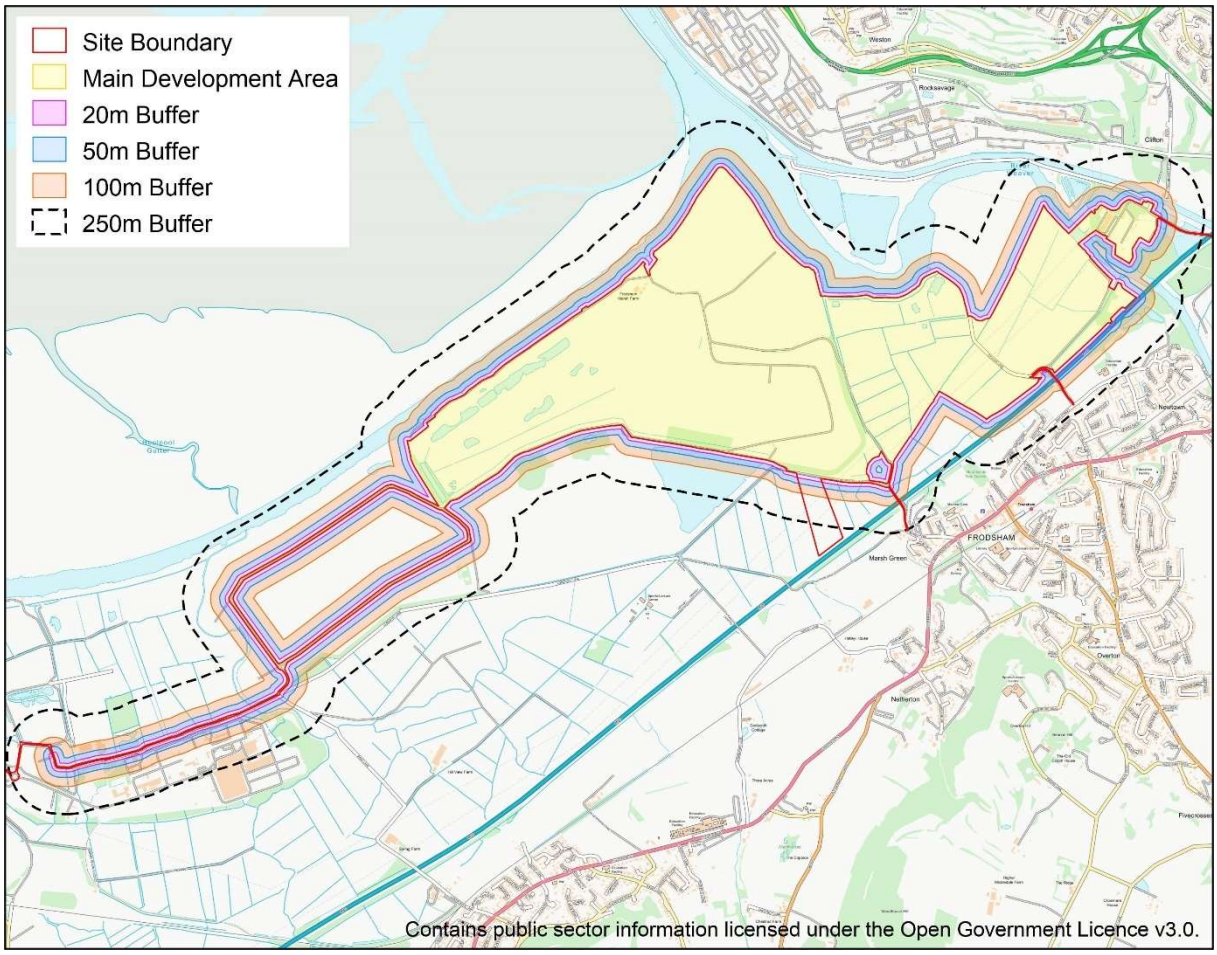
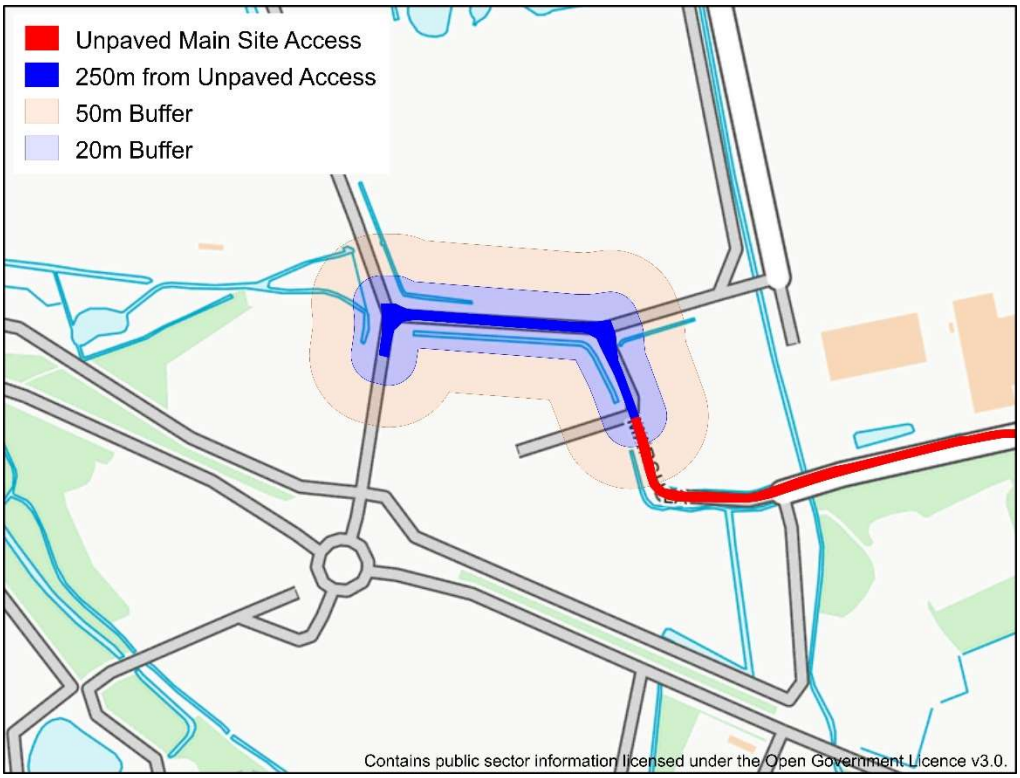


Figure 6.2: Track Out Assessment Area



Dust Emission Magnitude

6.2.4 The IAQM assessment methodology has been used to determine the potential dust emission magnitude for each aspect of the construction works ('source'). This has considered earthworks, construction and trackout for each Works Package and individual construction phase. As the various construction phases would often happen in tandem across the overall construction period (of approximately 30 months) the overall dust emission magnitude for the Scheme has been determined as a whole from the individual works assessments.

6.2.5 The potential dust emission magnitudes for activities at the Site have been assessed as follows:

Table 6.1: Overall Scheme - Dust Emission Magnitude

Activity	Class	Comment
Demolition	*n/a*	*No demolition works required*
Earthworks	Large	• Total Main Development Area >110,000 m^2 (at ~3,200,000 m^2). • Earthworks to include soil stripping, foundation and trench excavation works across the SADA, Grid Connections and soil-moving activities in NBBMA. • Assume >10 heavy-earth moving vehicles active at any one time. • Internal haulage to be via tracks provided with compacted aggregate.
Construction	Large	• Large Scheme area, although construction works mostly at surface level using pre-fabricated structures. • Above ground on-site construction limited to BESS / Frodsham Solar Substation. • Provision of permeable compacted aggregate laid on a geotextile membrane to all internal access tracks with the SADA. • Access for HGV deliveries and staff vehicles to Construction Compounds to include ~4km of tracks of compacted aggregate.
Trackout[1]	Medium	• Peak of 23 outward HGV movements per day from the Main Site Compounds onto the Main Site Access in Month 6. • Average of 8 outward HGV movements per weekday across the construction phase. • Peak of 244 outward LGV movements per day from the Main Site Compounds onto the Main Site Access in Month 13. • Average of 55 outward LGV movements per day across the construction phase. • Provision of permeable compacted aggregate laid on a geotextile membrane to all internal access tracks with the SADA. • Provision of wheel cleaning facilities within Main and Satellite Construction Compounds. • Departing HGVs and LGVs to travel ~4km of tracks provided with compacted hardcore before bound surfacing.

1: For the purposes of the assessment of trackout the exit has been taken as the point of exit from the unbound access road to the bound surfaced stretch of marsh lane

6.2.6 The greatest sources of dust are likely to be the soil moving activities in the NBBMA, internal haulage and movements along the unbound stretch of the Main Site Access. It is noted however that works in the NBBMA are only expected to last 9 months.

Area Sensitivity

6.2.7 The sensitivity of each area of the Site to dust soiling, human health (PM_{10} exposure) and ecological impacts has been assessed taking into the presence of sensitive receptors within the relevant screening distances, the sensitivity of those receptors and background air quality (with respect to PM_{10}).

6.2.8 The overall sensitivity assessment has been based on the distance of receptors to the Main Development Area and unbound stretch of the Main Site Access, rather than the full Order Limits.

6.2.9 The resulting sensitivity of the area to dust soiling, human health and ecological impacts has been assessed as summarised in Table 6.2. Identified receptors within the Assessment Area are shown in Figures 6.3 and 6.4.

Table 6.2: Sensitivity of Area[1, 2]

Activity	Sensitivity	Comment
Dust Soiling Effects on People & Property		
Earthworks Construction	High	• 10-100 high sensitivity receptors within 20m of Assessment Area *(two caravan sites with multiple occupants to immediate south of Western and Eastern Arrays; several Public Rights of Way run across the Assessment Area and along the Main Site Access)*
Trackout	Low	• >1 low sensitivity receptor within 20m of affected roads (*industrial properties lie within 50m of the Main Site Access; several Public Rights of Way run across the Assessment Area and along the Main Site Access*
Human Health Impacts		
Earthworks Construction	Low	• Predicted background PM_{10} <24 µg/m^3 • 10-100 high sensitivity receptors within 20m of Assessment Area *(two caravan sites to immediate south of Western and Eastern SADAs; several Public Rights of Way run across the Assessment Area and along the Main Site Access)*

Activity	Sensitivity	Comment
Trackout	Low	• Predicted background PM_{10} <24 µg/m^3 • >1 low sensitivity receptor within 20m of affected roads (*industrial properties lie within 50m of the Main Site Access; several Public Rights of Way run across the Assessment Area and along the Main Site Access*
Ecological Impacts		
Earthworks Construction	High	• The Mersey Estuary SPA / Ramsar site is located outside the 50m screening distance stipulated by IAQM guidance. However, Cells 1, 2 and 5 (within the Site) are considered to represent FLL to the Mersey Estuary SPA / Ramsar Site. These habitats are not considered to be particularly sensitive to dust soiling, in so much as they would remain functional for the bird species using them should they be impacted by construction dust. • Despite the designated features being not particularly sensitive to dust soiling, especially considering that the habitats would remain functional for the birds of the Mersey Estuary, a precautionary position has been adopted to assign *high* sensitivity. • SSSI within 20m of Assessment Boundary resulting in *medium* sensitivity (i.e. *part of Mersey Estuary SSSI lies within the NBBMA although qualifying features do not lie within the NBBMA).* • Several non-statutory designated sites lie within 20m of the Assessment Boundary resulting in *low* sensitivity *(e.g. Main Development Area lies within the Frodsham, Helsby & Ince Marsh LWS).*
Trackout	Low	• Several non-statutory designated sites within 20m of affected roads *(Main Site Access lies within Frodsham, Helsby & Ince Marsh LWS)* • Presence of industrial facilities within 25m of Main Site Access

1: Area = extent of Main Development Area and unbound stretch of Main Site Access

2: Area sensitivity classification as per IAQM Guidance as detailed in Appendix 11-1; only the highest level of area sensitivity is considered above as per IAQM guidance as detailed in Appendix A.

Figure 6.3: Area Sensitivity to Dust Soiling and Human Health Impacts

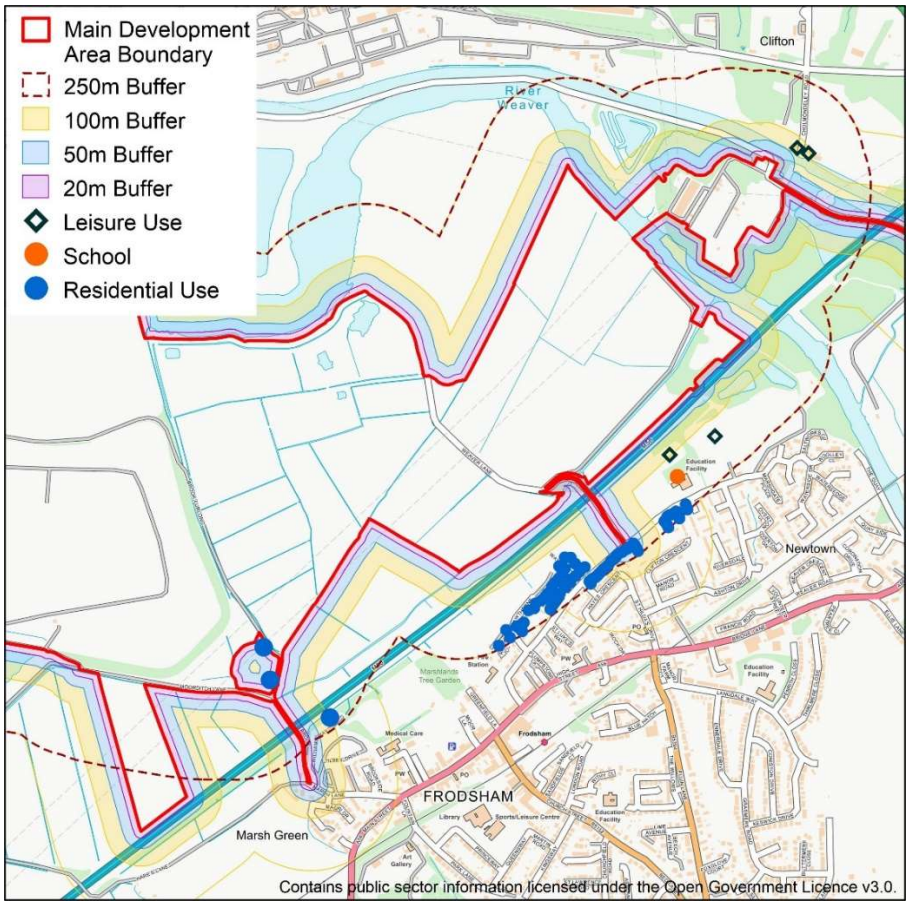
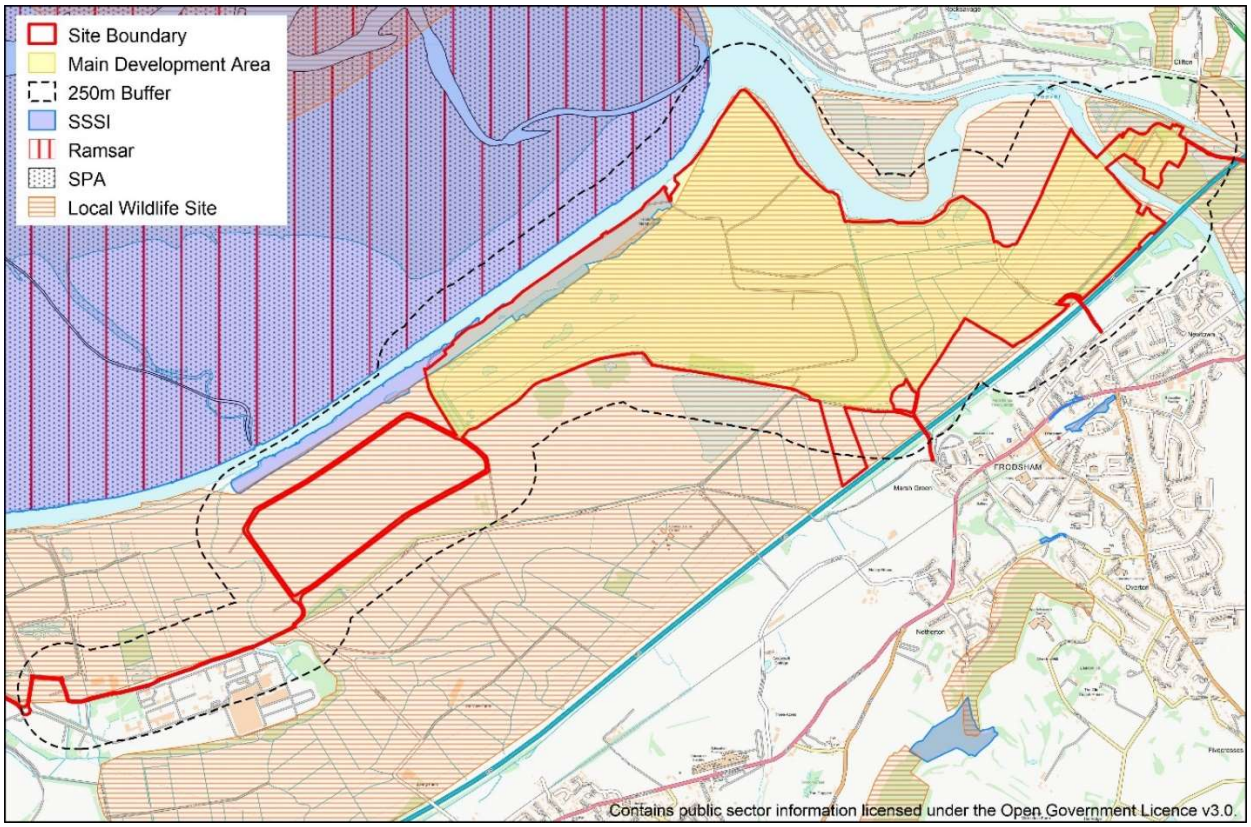


Figure 6.4: Area Sensitivity to Ecological Impacts



6.2.10 In determining the overall sensitivity of the area other factors should be taken into account such as other local dust generating sources and the prevailing wind direction. The following points are therefore noted with regards to the Site:

- prevailing wind direction is south-easterly through to north-westerly; cumulative frequency of winds blowing across the Western Array toward the nearby caravan parks is 31%.

6.2.11 The overall sensitivity is defined as set out below:

Table 6.3: Outcome of Defining the Sensitivity of the Area

Potential Impact	Sensitivity of Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	Low
Human Health	Low	Low	Low
Ecological	High	Medium	Low

Risk of Dust Impacts

6.2.12 Taking into account the dust emission magnitude and the sensitivity of the area, the risk of dust impacts, in the absence of mitigation, at nearby sensitive receptors are as follows:

Table 6.3: Summary of Risk of Dust Impacts

Potential Impact	Risk of Dust Impacts			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	*n/a*	High Risk	High Risk	Low Risk
Human Health	*n/a*	Low Risk	Low Risk	Low Risk
Ecological	*n/a*	High Risk	Medium Risk	Low Risk

6.2.13 In summary, the assessment indicates that there is a *high* risk of dust soiling impacts arising from fugitive dust during the earthworks and construction works, and a *low* risk of human health (PM_{10}) impacts associated with earthworks and construction works. These risks are greatest however for activities, including vehicle movements, occurring close to the southern edge of the SADA near the caravan parks. Risks would be reduced for those activities away from the southern site boundary.

6.2.14 There is a *high* risk of ecological impacts associated with earthworks and construction works due to the presence of FFL associated with the Mersey Estuary SPA / Ramsar site. It is noted that this is considered to be a precautionary position as the habitats of the designated features, and the FFL, are not considered to be particularly sensitive to dust impacts.

6.2.15

6.2.16 The proximity of the SSSI to the NBBMA and location of the unbound stretch of the Main Site Access within a Local Wildlife Site result in a *medium* risk of ecological impacts. and

6.2.17 There is a *low* risk of soiling, human health and ecological impacts due to trackout. This is associated with the proximity of industrial facilities and a Local Wildlife Site to the western stretch of Marsh Lane along the Main Site Access which forms low sensitive receptors.

6.2.18 The presence of an extensive PRoW network both across and in proximity to the Site is also noted. However, these form low sensitivity receptors and any exposure at the footpaths would be transient and of a short-duration with a resulting low risk of adverse impacts. Resulting effects would be not significant.

7 Management and Mitigation Measures

7.1 Introduction

7.1.1 The assessment concludes there is up to a high risk of adverse impacts at nearby sensitive receptors due to dust soiling. This is only predicted for when soil stripping, foundation and trench excavation works are occurring near to the caravan parks close to the southern edge of the SADA. At other times, whilst activities are away from sensitive boundaries risks fall to low.

7.1.2 The potential for fugitive dust generation during construction activities can however be readily controlled through the implementation of best practice in respect of dust control and site management. As detailed in the IAQM Guidance, for almost all construction activities the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effect would normally be negligible.

7.2 Mitigation

7.2.1 Given the scale of the Scheme mitigation measures would be employed to minimise the risk of adverse impacts.

7.2.2 The recommended standard and enhanced measures are set out in Table 7.1 below. These are based on recommended measures provided in the IAQM guidance for high risk sites, adapted as appropriate to the specific Proposed Development. These measures would serve to minimise fugitive dust generation and any potential PM_{10} and $PM_{2.5}$ emissions.

7.2.3 These measures are in addition to elements of the design which would reduce generation of fugitive dust, which include:

- use of existing fully paved access roads from the public highway for a distance of at least 1.8km;
- use of existing internal Frodsham Wind Farm Access Roads to provide access to the NBBMA and Solar Array Development Areas which are all formed of compacted stone and to be subject to minor improvement works prior to on-set of construction;
- provision of secondary construction compounds in addition to the two Main Construction Compounds to minimise internal haulage; and
- majority of above ground structures to be of modular, prefabricated or containerised design, including the BESS Control Building and Battery Transformer / Invertor Containers.

7.2.4 These measures are to be incorporated into the oCEMP [EN010153/DR/7.5] which as set out previously will be developed into a full CEMP by the appointed contractors. This is secured via a Requirement in Schedule 2 of the draft DCO [EN010153/DR/3.1]. Separate CEMP may be prepared by different contractors for the individual works packages, each of which would be based on the overarching principles set out in the oCEMP [EN010153/DR/7.5].

Table 7.1: Recommended Dust Mitigation Measures

Communications
Develop and implement a stakeholder communications plan that includes community engagement before work commences on the Proposed Development.
Display the name and contact details of the person(s) accountable for air quality and dust issues at the site entrance(s). This may be the environment manager / engineer or the site manager.
Display the head or regional office contact information.
Develop and implement a Construction Dust Management Plan (CDMP) to be incorporated within the oCEMP
Site Management
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken.
Make the complaints log available to the local authority when asked.
Record any exceptional incidents that cause dust and/or air emissions, both on- or off-site and the action(s) taken to resolve the situation in the log book.
Hold regular liaison meetings with any other high risk construction sites within 250m of the Order Limits, to ensure all plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport / deliveries which might be using the same strategic road network routes.
Monitoring
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked.
Carry out regular site inspections to monitor compliance with the DMP, record inspection results and make an inspection log available to the local authority, when asked.
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Preparing and maintaining the Site
Construction Compounds to be formed of semi-permanent hardcore / gravel mix laid on a geotextile membrane
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as practical or possible.
Erect solid screens or barriers around dusty activities or the Proposed Development that are at least as high as any stockpiles on the Proposed Development.
Fully enclose any specific operations where there is a high potential for dust production and the site is active for an extensive period.
Avoid site runoff of water or mud.

Keep site fencing, barriers and scaffolding clean using wet methods.
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site.
Cover, seed or fence stockpiles to prevent wind whipping.
Operating Vehicles / Machinery and Sustainable Travel
Ensure all vehicles switch off engines when stationary – no idling vehicles.
Minimise the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
Impose and signpost maximum-speed-limit of 10mph within the Main Development Area, NBBMA and internal haulage routes. Impose and signpost maximum-speed-limit of 20mph along the unbound stretch of the Main Site Assess along Marsh Lane
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
Full measures to encourage sustainable travel would be set out in the final CTMP that would be prepared by the contractor.
Operations
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques, such as water sprays or local extraction.
Ensure an adequate water supply on site for effective dust / particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
Provision of suitable dust suppression, particularly during prolonged dry and windy weather; to include use of water bowsers with suitable spray bars (or similar) to dampen down internal haul routes and exposed areas
Use enclosed chutes and conveyors and covered skips.
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use the fine water sprays on such equipment wherever appropriate.
Retention of stockpiles of loose materials for the shortest time period possible; stockpiles of materials to be clearly delineated
Ensure equipment is readily available on site to clean any dry spillages. Clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
Waste Management
Avoid bonfires and burning of waste materials.
Measures specific to Earthworks
Only remove the soil cover in small areas during work and not all at once to minimise exposed areas.
Re-vegetate earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable.
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
Measures specific to Construction
Ensure sand and other aggregates are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
Where practicable, storage of excavated soils from the SPEN and Private Wire Grid Connections adjacent to the trenches in preparation for backfilling
Avoid scabbling (roughening of concrete surfaces) if possible.

Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
Measures specific to Internal Traffic Movements & Trackout
Ensure sheeting of all incoming / outgoing vehicle carrying loose loads to prevent escape of materials during transport.
Inspect on-site haul routes, Main Site Access and SPEN Frodsham Substation access road for integrity; regular compaction, grading and maintenance to maintain a smooth running surface
Record all inspections of haul routes and any subsequent action in a site log book
Provision of compacted aggregate surfacing to internal haul routes; to be regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers.
Provision of wheel cleaning facilities at appropriate locations before exit onto the Main Site Access.
Regular inspections of the hard surfaced stretches of the Main Site Access and SPEN Frodsham Substation; use of water-assisted dust sweeper(s) on these roads to remove, any material tracked out of the Site as necessary.

7.2.5 Full measures are to be set out in the full CEMP to avoid, reduce or minimise impacts during the construction phase from potential localised contamination in made ground on the Site. This will include any specific dust suppression measures that may be required in relation to unsuspected contamination.

7.2.6 Through the incorporation of the mitigation measures set out above into the full CEMP, no unacceptable impacts or resulting effects on human health, amenity or ecological receptors are likely to arise.

7.3 Monitoring

7.3.1 Monitoring would include visual inspections and monitoring for dust as detailed above.

8 Summary and Conclusions

8.1 This report presents the Construction Dust Assessment that has been undertaken as a part of an Application for a DCO for the construction, operation and decommissioning of the Proposed Development. The assessment has been undertaken to inform the outline Construction Environmental Management Plan (oCEMP) is to be prepared for the construction phase of the Proposed Development.

8.2 A review of the current legislation, planning policy and a baseline assessment describing the current air quality considerations in the vicinity of the Proposed Development has been caried out.

8.3 The assessment has considered the potential for fugitive dust to be generated during the various elements of the construction phase across the Site. Potential impacts and resulting effects have been assessed taking into account the nature and extent of the Scheme, local wind data and the sensitivity of the surrounding area. The assessment has been carried out using the qualitative approach described in the latest IAQM guidance on construction dust[1].

8.4 The essence of guidance is that best practice working practices and mitigation measures are generally accepted as providing effective control against the impact of airborne dust and suspended particulate matter. These have been included within the oCEMP and would be further provided in the subsequent detailed CEMP that is expected to be a requirement of any consent.

8.5 Through the incorporation of the in-design mitigation and these standard dust mitigation measures no unacceptable impacts or resulting effects on human health, amenity or ecological receptors have been identified. The Proposed Development is not considered to contradict policy or legislation relating to air quality.

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APPENDIX A

Assessment Methodology

Frodsham Solar: Construction Dust Assessment

Appendix A: Construction Dust Assessment Methodology

1.1 Introduction

1.1.1. The assessment of the air quality impacts due to the generation and dispersion of dust and PM_{10} during the construction phase has been undertaken in accordance with the current guidance issued by the Institute of Air Quality Management (IAQM) in relation to demolition and construction dust[i]. The guidance describes a qualitative assessment methodology to assess the risks of dust and PM_{10} impacts from demolition, earthworks, and construction activities and from trackout, and provides guidance for assessing the significance of the effects. The assessment methodology is summarised below but for full details reference should be made to the IAQM guidance.

1.2 Screening Assessment

1.2.1 In accordance with the IAQM guidance, the following screening criteria are referred to indicate whether further detailed assessment is required:

- A human receptor within:
  - 250m of a site boundary; or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).
- An ecological receptor within:
  - 50m of the boundary of the site; or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s).

1.1.2. Where the need for further assessment can be screened out it can be concluded that the level of risk is *negligible*, and any effects would not be significant.

1.3 Further Assessment

1.3.1 Where further assessment is required, this is undertaken through use of the source-pathway-receptor concept. The risk of dust arising in sufficient quantities from a site to cause annoyance and / or health or ecological impacts and resulting effects is dependent on:

- the scale and nature of the works (potential ***magnitude*** of dust emissions);
- the ***effectiveness*** of the pathway (i.e., dispersion towards a receptor; proximity of receptors); and
- the ***sensitivity*** of the receptors, both human and ecological.

1.3.2 A site is allocated a Potential Dust Emissions Magnitude of large / medium / small for demolition, earthworks, construction and track out taking into account factors such as the size of the site, type of soils, building volume, and vehicle movements. Examples are provided below:

Table 1: Examples definitions to define dust emission magnitudes for each activity

Activity	Dust Emission Magnitude		
	Large	**Medium**	**Small**
Demolition	>75,000m^3 build volume dusty material (e.g. concrete) on-site crushing	between 12,000m^3 and 75,000m^3 build volume potentially dusty material	<12,000m^3 build volume low dust material occurs in winter
Earthworks	>110,000m^2 site area dusty soil type (e.g. clay) >10 active plant	between 18,000m^2 and 110,000m^2 site area possible dusty soil type (e.g. silt) 5-10 active plant	<18,000m^2 site area large grain soil type (e.g. sand) <5 active plant
Construction	>75,000m^3 build volume onsite concrete batching	between 12,000m^3 and 75,000m^3 build volume dusty construction material (e.g. concrete)	<12,000m^3 build volume low dust construction material (e.g. metal)
Trackout	>50 outward HDV movements unpaved road 100m	20-50 outward HDV movements unpaved road 50-100m	<20 outward HDV movements unpaved road <50m

1.3.3 The impact of generated dust will depend on the sensitivity of an area. The sensitivity of the area is determined for dust soiling, human health, and ecological impacts respectively taking into account several factors, as follows:

- the specific sensitivities of receptors in the area;
- the number of those receptors;
- the distance of the receptors from the dust source;
- in the case of PM_{10}, the local background concentrations; and
- site specific factors, such as whether there are natural shelters or screening e.g. trees to reduce the risk of wind-blown dust.

1.3.4 Examples of receptor sensitivities are summarised in the tables 2-4 below.

Table 2: Example sensitivity of receptors to dust soiling effects

Sensitivity		
High	**Medium**	**Low**
Users expect high level of amenity Users continuously present Property appearance / value would be expected to be diminished by dust soiling	Users expect reasonable level of amenity Users are not present continuously Property appearance / value might be expected to be diminished by dust soiling	Users do not expect reasonable level of amenity Users present for limited time Property appearance / value would not be expected to be diminished by dust soiling
Examples		
Dwellings, car showrooms, long-term car parks, sensitive horticultural land	Places of work, parks	Short-term car parks, playing fields, footpaths, non-sensitive farmland, roads

Table 3: Example sensitivity of receptors to PM_{10} health effects

Sensitivity		
High	**Medium**	**Low**
Exposure of members of the public for eight hours or more in a day	Exposure of workers for eight hours or more in a day	Exposure is transient
Examples		
Members of the public Dwellings, hospital, schools, care homes	Workers Offices, shops	Playing fields, footpaths, parks, shopping streets

Note: assessment of sensitivity also takes into account local background PM_{10} concentrations

Table 4: Example sensitivity of receptors to ecological effects

Sensitivity		
High	**Medium**	**Low**
Locations with international or national designation where the designated feature may be affected by dust soiling. Locations with communities of dust-sensitive species.	Locations with national designation where the designated feature may be affected by dust soiling. Locations with important species where dust sensitivity is uncertain.	Locations with local designation where the designated feature may be affected by dust soiling.

1.3.5 Receptors are considered up to the following distances:

Table 5: Summary of Distances to Receptors Considered

	Dust Soiling	Human Health	Ecological
Demolition, earthworks, and construction	up to a distance of 250m from a site		up to a distance of 50m from a site
Trackout	up to a distance of 50m from the edge of a road used for construction traffic and up to 250m from the site exit along that road		

1.3.6 The overall sensitivity of an area to dust soiling effects can therefore be assessed as summarised in the example table below.

Table 6: Example Summary of the Outcome of the Sensitivity of the Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	**Earthworks**	**Construction**	**Trackout**
Dust Soiling	High	High	High	Medium
Human Health	High	High	High	High
Ecological	Medium	Medium	Low	Low

1.3.7 The overall risk of impacts and effects for each activity considers the derived sensitivity of the area and the dust emission magnitude for each phase of the development, as summarised in the matrix below.

Table 7: Risk of Dust Impacts

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

1.3.8 Other factors such as local topography and prevailing wind direction are also considered.