HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

6.5.13 ES Volume E - Off-Site Power Station Facilities: AECC, ESL and MEEG App E5-1 - Construction Dust Assessment - Off-Site Power Station Facilities

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1 Executive Summary

1.1.1 Major construction sites can give rise to increased long-term and short-term particulate matter concentrations at off-site locations, and may also cause annoyance to people and damage to vegetation due to the soiling of surfaces by dust, unless the appropriate mitigation measures are implemented. The effects of dust from activities associated with construction of the Off-Site Power Station Facilities have therefore been evaluated in this assessment.

1.1.2 The results of the dust assessment indicate that at sensitive human receptors all activities are predicted to be either a Low risk or Negligible risk for potential human health impacts. For potential dust soiling effects there is predicted to be a Medium risk from demolition, earthworks and trackout activities and a Low risk from construction activities.

1.1.3 As per Institute of Air Quality Management (IAQM) guidance [RD1], the absence of any relevant ecological sites within 50m of the boundary of the Off-Site Power Station Facilities site or within 50m of the route(s) used by construction vehicles up to 500m from the site entrance(s), meant the potential effects of construction dust on ecological sites was not required to be considered further.

1.1.4 Based on experience of the application of existing mitigation methods at other construction sites, it is considered that all Medium and Low risk activities identified can be managed through the adoption of a suite of good practice mitigation measures and a monitoring programme to monitor the effectiveness of their application at reducing off-site impacts.

1.1.5 The measures taken forward from this assessment to control dust emissions and monitor the effectiveness of the mitigation are included as part of the air quality management strategies set out within the Wylfa Newydd Code of Construction Practice (Wylfa Newydd CoCP (Application Reference Number: 8.6)) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9).

1.1.6 IAQM guidance [RD1] notes that with the application of good practice mitigation measures of the type available for use on this project, the environmental effect will not be significant at any off-site receptor. IAQM guidance [RD1] also notes that, even with a rigorous package of mitigation measures in place, such as those taken forward from this assessment and included as part of the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9), occasional impacts may occur. The Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9) provides a framework by which the level of mitigation is adapted to respond proactively to the changing risk of dust emissions, so that significant effects are prevented.

1.1.7 The appraisal of the potential dust emissions from activities associated with the construction of the Off-Site Power Station Facilities show that dust is

likely to be generated from site activities and there would be a Medium risk of impacts to human receptors. However, it is considered that all risks can be effectively managed through the application of appropriate good practice mitigation measures. Therefore, it is concluded that these works are not likely to generate unacceptable dust impacts to receptors, and the effect would be not significant.

2 About this report

2.1 Purpose and applicability

2.1.1 Emissions of dust to air can occur from works associated with the preparation of land (e.g. demolition, land clearing or grading, and earth moving and excavation) and during construction. This report sets out the assessment of dust which could potentially be emitted to air from the activities associated with the construction of the Off-Site Power Station Facilities.

2.2 Terms and definitions

Table 2-1 Terms and definitions

Term	Definition
A5025 Off-line Highway Improvements	Highway improvements that involve the construction of new sections of the A5025. These would involve the construction of new junctions, new sections of road to bypass local communities, and localised bend improvements generally beyond the existing highway boundaries.
A5025 On-line Highway Improvements	Highway improvements that are made to the existing A5025 road, generally within the existing highway corridor. The A5025 On-line Highway Improvements are being consented under a separate Town and Country Planning Act 1990 (TCPA) application. The improvements are to be made between the A5 east of Valley Junction to the proposed Power Station Access Road Junction, to include reconstruction and localised widening of the existing pavement and application of a surface dressing. The proposals also comprise a temporary Construction Compound including a temporary pavement recycling facility, and other associated works such as drainage infrastructure, boundary treatments, planting, new signage and road markings.
Abnormal Indivisible Loads (AILs)	A load that cannot be divided for the purpose of being carried on a road without undue expense or risk of damage.
Alternative Emergency Control Centre (AECC)	A component of the Off-site Power Station Facilities which provides back-up command and communications facilities that would be used to manage an incident at the Power Station Site in the extremely unlikely event that the primary facilities on the Power Station Site were not available.

Term	Definition
Ancient woodland	A woodland that has existed continuously since 1600 or before in England, Wales and Northern Ireland.
Annoyance (dust)	Loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to constitute a nuisance according to legal definition.
Associated Development	Works included in the DCO which facilitate the delivery of the NSIP, and which include: the Site Campus; Park and Ride; Logistics Centre; and the A5025 Off-line Highway Improvements.
Construction	Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. The term 'structure' is defined to include a road, bridge, pipeline, building, etc.
Cooling Water System	The once-through system that removes, using Cooling Water, the proportion of heat energy produced by the Units which cannot be converted into electricity, and includes the intakes, pumphouses, breakwaters, seal pits and outfall structures as well as connecting pipelines and tunnels for each Unit.
Demolition	Any activity involved with the removal of an existing structure (or structures). This may also be referred to as deconstruction, specifically when a building is to be removed a small part at a time.
Deposited dust	Dust that is no longer in the air and which has settled onto a surface. Deposited dust is also sometimes called amenity dust or nuisance dust, with the term nuisance applied in the general sense rather than the specific legal definition.
Development Consent Order (DCO)	The consent for an NSIP required under Section 37 of the Planning Act 2008.
Dust	Solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air. The terms dust and particulate matter (PM) are often used interchangeably, although in some contexts one term tends to be used in preference to the other. In this assessment the term 'dust' has been used to include the particles that give rise to soiling, and to human health (i.e. PM_{10} or $PM_{2.5}$) and ecological effects. Note: this is different to the definition given in BS 6069-2:1994, where dust refers to particles up to 75µm in diameter [RD2].

Term	Definition
Earthworks	Covers the processes of soil-stripping, ground-levelling, excavation and landscaping.
Effects	The consequences of the changes in airborne concentrations and/or dust deposition for a receptor. These might manifest themselves as annoyance due to an increase in the dust deposition rate, increased health effects due to exposure to PM_{10} or $PM_{2.5}$ or plant dieback due to reduced photosynthesis. The term 'significant effect' has a specific meaning in Environmental Impact Assessment regulations. The opposite is a 'not significant effect'. In the context of construction impacts, any effect will usually be adverse; however, professional judgement is required to determine whether this adverse effect is significant based on the evidence presented.
Enabling Works	Works comprising the A5025 On-line Highway Improvements and Site Preparation and Clearance Proposals which are being consented under the TCPA.
Environmental Impact Assessment (EIA)	The process through which the likely significant effects of a development on the environment are identified and assessed.
Environmental Survey Laboratory (ESL)	A component of the Off-site Power Station Facilities that performs a normal operating function for environmental monitoring and, as such, would contain facilities such as monitoring equipment to conduct radiological surveys in the local area.
Heavy Duty Vehicle (HDV)	Heavy duty vehicles include a vehicle with a gross weight of more than 3.5 tonnes and buses.
Impacts	The changes in airborne concentrations and/or dust deposition. A scheme can have an 'impact' on airborne dust without having any 'effects', for instance if there are no receptors to experience the impact.
Logistics Centre	A temporary secure facility from where deliveries to the Power Station Site during construction would be managed to reduce traffic on and impacts to the local road network.
Main Construction	Construction activities within the Wylfa Newydd Development Area that would result in the completion of the Power Station, including final levelling and deep excavations for the Power Station foundations, civil construction activities, commissioning of both Units and site finishing.

Term	Definition
Marine Off-Loading Facility (MOLF)	A facility comprising three purpose built quays: one mainly for the delivery of large construction components including AILs, and two mainly for bulk materials such as aggregates and cement.
Mobile Emergency Equipment Garage (MEEG)	A component of the Off-site Power Station Facilities which would provide managed storage of vehicles and equipment for responding to any incidents that might arise during the operational phase of the Power Station.
Nationally Significant Infrastructure Project (NSIP)	A type of project listed in the Planning Act 2008, which must be consented by a DCO. These include proposals for power plants, large renewable energy projects, new airports and airport extensions and major road projects.
Non-road mobile machinery	Any mobile machine, item of transportable industrial equipment, or vehicle – with or without bodywork – that is not intended for carrying passengers or goods on the road and is installed with an internal combustion engine.
Nuisance	The term nuisance dust is often used in a general sense when describing amenity dust. However, this term also has specific meanings in environmental law: (a) statutory nuisance, as defined in S79(1) of the Environmental Protection Act 1990 (as amended); (b) private nuisance, arising from substantial interference with a person's enjoyment and use of his land; and (c) public nuisance, arising from an act or omission that obstructs, damages or inconveniences the rights of the community. Each of these applies in as far as the nuisance relates to the unacceptable effects of emissions. It is recognised that a significant loss of amenity may occur at lower levels of emission than would constitute a statutory nuisance.
Numerical Weather Prediction (NWP)	A method of predicting weather through the use of a series of mathematical equations.
Off-site Power Station Facilities	Comprising the AECC, ESL and MEEG.
Park and Ride	A temporary facility where workers could park their vehicles securely and transfer to shuttle buses, which would take them to the Power Station Site. The site is designed to include a zone for buses to collect and drop off passengers, with a management office and parking for staff (working at the Park and Ride).

Term	Definition
Particulate Matter (PM)	Airborne particulate matter is made up of a collection of solid and/or liquid materials of various sizes that range from a few nanometres in diameter (about the size of a virus) to around 100 microns (about the thickness of a human hair).
Planning Act 2008	The Planning Act 2008 is the primary legislation that establishes the legal framework for applying for, examining and determining DCO applications for NSIPs.
PM_{10}	Particulate matter with an aerodynamic diameter of 10 microns or less.
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of 2.5 microns or less.
Power Station	The proposed new nuclear power station at Wylfa, including two UK Advanced Boiling Water Reactors, the Cooling Water System, supporting facilities, buildings, plant and structures, radioactive waste and spent fuel storage buildings and the Grid Connection.
Power Station Site	The indicative areas of land and sea within which the majority of the permanent Power Station, Marine Works and other on-site development would be situated.
Receptor	A location that may be affected by air pollution, including dust deposition.
Risk	The likelihood of an adverse event occurring.
Site Campus	A temporary facility that would house up to 4,000 construction workers in modular type accommodation blocks, providing an independent living space for each worker, with shared campus-style amenities.
Site of Special Scientific Interest (SSSI)	Site designated as being of special interest for its flora, fauna or geological or physiographical features and protected under the Wildlife and Countryside Act 1981.
Site Preparation and Clearance Proposals (SPC Proposals)	The SPC works and associated proposals for methods of working and temporary road closures. The SPC Proposals will be consented under the TCPA and also form part of the DCO application.
Site Preparation and Clearance Works (SPC Works)	The SPC works carried out to prepare the Wylfa Newydd Development Area for Main Construction, including site establishment, soil remediation, erection of fencing, habitat clearance, demolition and diversion of a watercourse.

Term	Definition
Special Area of Conservation (SAC)	An area which has been identified as being important for a range of vulnerable habitats, plant and animal species within the European Union and are designated under the Habitats Directive.
Sub-Code of Construction Practice (sub-CoCP)	A certified document which sets site-specific commitments to mitigate the effects identified in the Environmental Statement and other assessments. There are 6 sub-CoCPs for the Wylfa Newydd Project including: • Main Power Station Site sub-CoCP; • Marine Works sub-CoCP • Off-Site Power Station Facilities sub-CoCP; • Park and Ride facility sub-CoCP; • Logistics Centre sub-CoCP; and • A5025 Off-line sub-CoCP.
Town and Country Planning Act 1990 (TCPA)	The Act that forms part of the land use planning regime in the UK and (among other things) establishes the legal framework in respect of applications for, and determination of, planning permissions.
Trackout	The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when HDVs leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on-site.
UK Advanced Boiling Water Reactor (UK ABWR)	The UK ABWR derives from the generic design of the ABWR. The standard design of the first ABWRs (Kashiwazaki-Kariwa units 6 & 7 in Japan) together with improvements and optimisation from subsequent ABWR plants (Ohma and Shimane 3) and implementation of learning from the Fukushima-Daichii represent the reference plant for the Power Station.
Wildlife Site	A non-statutory designated site of nature conservation interest.

Term	Definition
Wylfa Newydd Code of Construction Practice (Wylfa Newydd CoCP)	A document to set out and secure project-wide environmental requirements in accordance with the mitigation of construction activities relied on in the Environmental Statement, as well as construction commitments made through other assessment processes undertaken for the Wylfa Newydd Project (such as: • the Welsh Language Impact Assessment; • Health Impact Assessment; • HRA; • WFD Compliance Assessment, and • Equality Impact Assessment). The Wylfa Newydd CoCP and accompanying sub-CoCPs will be submitted and approved as part of the DCO application for the Wylfa Newydd DCO Project.
Wylfa Newydd Development Area	The indicative areas of land and sea including the Power Station Site and the surrounding areas that would be used for the construction and operation of the Wylfa Newydd Development Area Development.
Wylfa Newydd DCO Project	The elements of the Wylfa Newydd Project for which consent is being sought through the DCO comprising the construction and operation of the Power Station, other on-site development, the Marine Works, the Off-Site Power Station Facilities and the Associated Development.
Wylfa Newydd Project	The Wylfa Newydd Project (the Project) comprises the Wylfa Newydd DCO Project and the Enabling Works.

2.3 Responsible parties

Table 2-2 Responsible parties

Responsible Party	Description
Horizon Nuclear Power Wylfa Ltd (Horizon)	Horizon is a UK energy company developing a new generation of nuclear power stations to help meet the UK's need for stable and sustainable low carbon energy. Horizon's ultimate parent company is Hitachi Ltd., a Japanese corporation and the parent company of the multi-national Hitachi group of companies. Horizon is part of the Horizon Nuclear Power Limited group of companies which has premises in Gloucestershire and a site office on Anglesey.
Isle of Anglesey County Council (IACC)	The local authority governing the area within which the Wylfa Newydd Project is intended to be constructed.
Jacobs UK Ltd (Jacobs)	Consultants appointed by Horizon to undertake the Environmental Impact Assessment for the Wylfa Newydd Project.
Natural Resources Wales (NRW)	The public body whose stated purpose is to ensure that the natural resources of Wales are sustainably maintained, enhanced and used, now and in the future. It absorbed the regulatory and advisory duties of the Environment Agency Wales, Countryside Council for Wales and the Forestry Commission in Wales.

2.4 Scope

2.4.1 This report sets out the assessment of emissions of dust which could potentially occur from the construction of the Off-Site Power Station Facilities. This assessment has been carried out in accordance with the latest IAQM guidance [RD1] on the assessment of dust from demolition and construction. This report sets out the full construction dust assessment, including a description of the methodology, relevant input data, the assessment itself, recommended mitigation and monitoring measures and conclusions.

3 Assessment methodology

3.1 Introduction

3.1.1 Activities carried out on construction sites can give rise to emissions of dust which could cause annoyance to people or damage to vegetation due to the soiling of surfaces. These activities can also lead to increased short-term and long-term concentrations of fine particulate matter (e.g. PM_{10} and $PM_{2.5}$) at off-site locations which may affect human health, unless the appropriate mitigation measures are implemented. The impacts of dust emissions from the activities associated with the construction of the Off-Site Power Station Facilities therefore need to be addressed in order to identify the required mitigation measures.

3.1.2 The assessment of dust during construction has been carried out using a qualitative risk-based appraisal with reference to the location of the Off-Site Power Station Facilities site in relation to sensitive receptors, the planned process and site characteristics, as described in IAQM guidance [RD1].

3.1.3 IAQM guidance [RD1] aims to estimate the impacts of both PM_{10} and dust together, through a combined risk-based assessment procedure. IAQM guidance [RD1] provides a methodological framework, but notes that professional judgement is required to assess impacts. This assessment does not consider the air quality impacts of exposure to contaminated dusts that could arise from the remediation of contaminated land. Although $PM_{2.5}$ is not specifically included as a parameter within the assessment, the risk levels associated with PM_{10} and any subsequent mitigation measures would also apply to $PM_{2.5}$ as $PM_{2.5}$ is included within the PM_{10} fraction.

3.2 Potential sources

3.2.1 The temporary and varied nature of construction or other processes which include similar emission sources differentiates it from other fugitive dust sources when it comes to the estimation and control of emissions. The process usually consists of a series of different operations, each with its own duration and potential for dust generation. Dust emissions from any single site can be expected to have a definable beginning and end but would also vary between the same types of activities. On large sites, the location and scale of potentially dust-generating activities would also vary throughout the works.

3.2.2 There are potentially sensitive locations close to the boundary of the Off-Site Power Station Facilities site including residential properties, a primary school and Public Rights of Way. Activities associated with the construction of the Off-Site Power Station Facilities have the potential to produce excessive emissions of dust that could be transported towards receptors by the wind. These are close enough to the Off-Site Power Station Facilities site that without mitigation measures, they could perceive increases in the rate of dust deposition to property surfaces.

3.2.3 The activities associated with the construction of the Off-Site Power Station Facilities are described in detail in chapter E1 (proposed development)

(Application Reference Number: 6.5.1) of the Environmental Statement. The key potential construction dust emission sources associated with these activities are summarised below. Where possible, these have been assigned into the four categories used for IAQM dust assessment [RD1] method of demolition, earthworks, construction and trackout. These are described below.

- Demolition activities: demolition of the two existing commercial garages, a motor vehicle repair building, associated infrastructure and a dwelling within the Off-Site Power Station Facilities site.
- Earthworks: activities include topsoil stripping, establishing the site compound and excavation for foundations for the MEEG/AECC building and the ESL building. Another potential source is wind picking up dust from material stockpiles and storage mounds which could occur if the wind speed is high enough, and the stored material is dry, friable and mitigation measures were not in place.
- Construction activities: construction of the MEEG/AECC building, ESL building, infrastructure and associated activities relating to the construction of the site compound.
- Vehicle movement and trackout: vehicles moving on and around the Off-Site Power Station Facilities site emitting exhaust particulate matter and re-suspending loose material on the road. There would be the potential for spillage, from transferring material around the Off-Site Power Station Facilities site and from particulates being lifted from open container vehicles by the wind generated by the vehicle movement. Material tracked out on to the local road network on the wheels of site traffic could be re-suspended by passing traffic.

3.2.4 The construction dust assessment comprises a qualitative risk-based appraisal of the potential sources of dust and the impacts at the sensitive locations close to the Off-Site Power Station Facilities site. Based on the calculated risk level, IAQM guidance [RD1] sets out clear requirements for the recommended mitigation measures which can be used to minimise the impact of dust during the construction phase of a development. The mitigation measures taken forward from this assessment are included as part of the approved air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9).

3.2.5 Larger dust particles (greater than 30µm) make up the greatest proportion of dust emissions from mineral workings or earthworks and will largely deposit within 100m of sources [RD3]. Intermediate sized particles (10µm–30µm) are likely to travel further distance. PM_{10} including the smaller $PM_{2.5}$ particulates are reported to make up a smaller proportion (approximately 10%) of dust emitted from most workings and the emissions become diluted as they disperse down-wind [RD4].

3.3 Baseline conditions

3.3.1 The assessment requires characterisation of the existing conditions with regard to PM_{10} concentrations to determine the sensitivity of the area. A PM_{10} concentration of 14.9µg/m^3 has been used in this assessment to represent the background concentration. This concentration was recorded by the IACC during 2016 at a location adjacent to the Wylfa Newydd Development Area approximately 5.5km north-northeast of the Off-Site Power Station Facilities site. The PM_{10} concentration recorded by the IACC is considered appropriately representative of the background concentration at the Off-Site Power Station Facilities site. In accordance with the IAQM methodology [RD1], the contribution from other local sources was also taken into account. In this case, the contribution to the background concentration from road traffic emissions on the A5025 which was anticipated to occur during the construction of the Off-Site Power Station Facilities was included using dispersion modelling. This resulted in a maximum predicted total PM_{10} concentration of 15.7µg/m^3 at any of the relevant receptors to be considered as part of the construction dust assessment. Details of the dispersion modelling of road traffic emissions are provided in chapter C4 (air quality effects of traffic) (Application Reference Number: 6.3.4) of the Environmental Statement.

3.3.2 The IACC also undertook dust deposition measurements of dust deposition rates at several locations in the vicinity of the Wylfa Newydd Development Area in in 2012, 2013 [RD5] and 2016 [RD6]. The measured dust deposition rates ranged from 25.8 to 35.8 milligrams per square metre per day (mg/m^2/day). These were reported by the IACC to be indicative of dust deposition rates for 'open country', and are well below the levels of dust deposition rate that could possibly affect amenity. Suggested guidelines for the dust deposition rate for when complaints are likely are set out in *Suggested Guidelines for Deposited Ambient Dust* [RD7] and range from 140mg/m^2/day for open countryside to 200mg/m^2/day for residential areas and outskirts of towns (based on a large number of UK measurements [RD7]). The value for indicating when complaints are likely, based on site-specific baseline measurement data in the vicinity of the Wylfa Newydd Development Area, would be lower than the 140mg/m^2/day value as the baseline measurements are generally lower than the UK-wide rural dataset. The measurements are also below the levels of dust deposition rates that could potentially affect sensitive vegetation [RD8].

3.3.3 The dust deposition measurements recorded in the vicinity of the Wylfa Newydd Development Area would be broadly representative of the dust deposition in most rural locations on Anglesey that are not close to specific sources of dust. As there are no significant sources of dust emissions near to the Off-Site Power Station Facilities, the dust deposition in the vicinity of the site would be expected to be similar.

3.4 Local climatic conditions

3.4.1 Although not specifically required as part of the IAQM dust assessment method, analysis of the local climatic conditions was also undertaken to

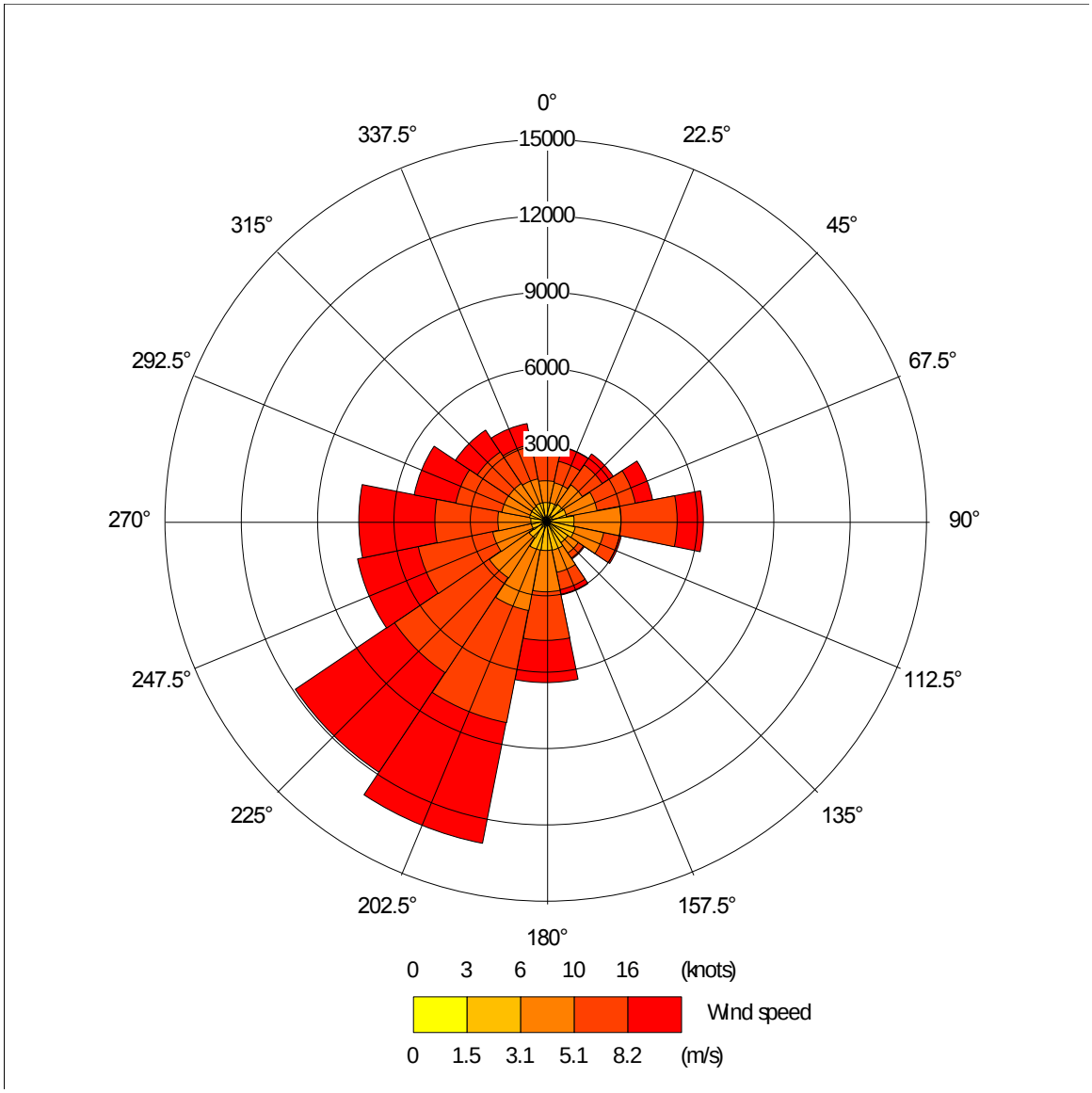
provide additional context to the risk assessment and assist in the determination of the sensitivity of the area.

3.4.2 Local climatic conditions such as wind speed and precipitation (rainfall) will affect the probability of airborne dust occurring from potentially dusty activities, or from open areas and stockpiles, and can also affect the dispersion of dust in the air. The wind direction is a useful parameter to understand the likelihood of effects occurring at sensitive locations if dust is emitted or becomes airborne and how severe its effects could potentially be.

3.4.3 Meteorological data covering the period 1 January 2007 to 31 December 2016 were obtained from the Met Office for the location of the Wylfa Newydd Development Area. This was based on the NWP model and is representative of the climatic conditions experienced at the Off-Site Power Station Facilities site. The wind data and associated precipitation rate data were examined to determine the frequency of occurrence of winds that blow towards receptor locations, strength of winds and frequency of rainfall in order to evaluate the likelihood of sensitive receptors located in the vicinity of the Off-Site Power Station Facilities being potentially affected by fugitive dust emissions.

3.4.4 A wind rose for the NWP data has been provided in figure 3-1 for the period 1 January 2007 to 31 December 2016. The wind rose plot shows the direction the wind blows from, in five wind speed categories and the number of hours that it blows in each combination of speed and direction.

Figure 3-1 Windrose – Wylfa Newydd Development Area NWP 2007 - 2016



3.4.5 Table 3-1 (below) tabulates the wind speed and direction data (based on hourly data) into 16 wind direction sectors, each of 22.5°, representing the commonly described wind directions (e.g. south (S) centred on 180°, south-southwest (SSW) centred on 202.5°, southwest (SW) centred on 225°, and so on). Table 3-2 (below) tabulates the wind speed and direction for dry periods (i.e. days with less than 1mm precipitation).

Table 3-1 Wylfa Newydd Development Area NWP data wind analysis (1 January 2007 – 31 December 2016)

Wind Speed at Height of 10m (m/s)	Wind Direction Sector																Total
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 – 0.5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**0.3%**
0.5 – 5.0	1.7%	1.7%	1.9%	2.3%	3.2%	2.6%	1.8%	2.4%	3.1%	3.9%	2.9%	2.3%	2.0%	1.9%	1.9%	1.8%	**37.5%**
5.0 – 7.5	1.0%	0.8%	1.0%	1.5%	2.2%	0.7%	0.3%	0.7%	1.8%	4.2%	4.1%	2.8%	2.3%	1.7%	1.5%	1.4%	**28.2%**
7.5 – 10.0	0.5%	0.5%	0.5%	0.8%	1.1%	0.1%	0.1%	0.3%	1.4%	3.5%	3.5%	1.9%	1.9%	1.4%	0.9%	0.7%	**19.1%**
>10	0.3%	0.3%	0.3%	0.3%	0.5%	0.0%	0.0%	0.1%	1.0%	3.2%	3.1%	1.6%	2.1%	1.0%	0.6%	0.5%	**14.8%**
Total	**3.6%**	**3.4%**	**3.7%**	**4.9%**	**7.1%**	**3.5%**	**2.1%**	**3.5%**	**7.3%**	**14.8%**	**13.6%**	**8.7%**	**8.4%**	**6.0%**	**4.9%**	**4.5%**	**100.0%**

Table 3-2 Wylfa Newydd Development Area NWP data wind analysis during dry days (daily rainfall less than 1mm) (1 January 2007 – 31 December 2016)

Wind Speed at Height of 10m (m/s)	Wind Direction Sector																Total
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	
0 – 0.5	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**0.2%**
0.5 – 5.0	1.4%	1.4%	1.6%	1.8%	2.4%	1.8%	1.1%	1.5%	2.0%	2.6%	1.9%	1.4%	1.3%	1.3%	1.5%	1.5%	**26.4%**
5.0 – 7.5	0.8%	0.7%	0.8%	1.2%	1.5%	0.4%	0.1%	0.2%	0.6%	2.3%	2.2%	1.4%	1.3%	1.1%	1.0%	1.0%	**16.5%**
7.5 – 10.0	0.4%	0.4%	0.4%	0.5%	0.7%	0.0%	0.0%	0.1%	0.3%	1.3%	1.4%	0.7%	0.8%	0.8%	0.5%	0.5%	**8.7%**
>10	0.2%	0.1%	0.1%	0.2%	0.3%	0.0%	0.0%	0.0%	0.1%	0.7%	0.9%	0.4%	0.8%	0.4%	0.3%	0.3%	**4.8%**
Total	**2.8%**	**2.5%**	**2.8%**	**3.8%**	**4.9%**	**2.2%**	**1.2%**	**1.7%**	**3.0%**	**7.0%**	**6.4%**	**4.0%**	**4.2%**	**3.6%**	**3.3%**	**3.3%**	**56.7%**

3.4.6 Table 3-1 presents the frequency of winds as a percentage of all winds between 2007 and 2016 for each 22.5° wind direction sector within specified wind speed bands. Table 3-1 and figure 3-1 illustrates that the most frequently occurring wind direction is from the south-southwest occurring for 14.8% of the time, with winds from a southwesterly direction also occurring frequently (13.6%). This indicates that receptors to the north-northeast or northeast of any construction activity generating dust emissions would have the highest probability of experiencing potential increases in dust deposition or PM_{10} concentrations.

3.4.7 The wind speed required to raise dust particles into the air from a surface, known as wind erosion, is dependent upon the size of the particle and other factors. In general, the higher the wind speed the greater the potential for the generation of airborne dust. It is generally accepted that wind erosion only becomes significant at wind speeds in excess of 5.0m/s at the surface based on a reference wind speed height at 10m. Table 3-1 shows that calm conditions (<0.5m/s) occur for approximately 0.3% of the time. Wind speeds between 0.5m/s and 5.0m/s occur for approximately 37.5% of the time, and wind speeds greater than 5.0m/s occur for 62.1% of the time.

3.4.8 However, the potential for dust to be emitted to air is higher during periods of extended dry weather. During periods of wet weather, dust emissions from surfaces would be decreased, as surfaces will be wet. Any coarse dust that becomes airborne would also be minimised through removal from the atmosphere through washout during periods of rainfall. When considering the lower potential for wind erosion to occur on days when it has been raining (assumed to be where the total rainfall in a day was 1mm or greater), table 3-2 shows that the percentage of time when the wind is above 5.0m/s and the conditions were dry is much lower, at 30% of the time.

3.4.9 Table 3-3 displays an analysis of precipitation rate data between 2007 and 2016 for the Wylfa Newydd Development Area and indicates that dry hours occur for over two-thirds of the total hours considered from the 10 years of meteorological data considered.

Table 3-3 Wylfa Newydd Development Area NWP precipitation data analysis (1 January 2007 to 31 December 2016)

Precipitation rate (mm/hour)	Frequency
0	72.2%
0.1 - 0.5	21.5%
0.5 - 1.0	2.4%
1.0 - 1.5	1.3%
1.5 - 2.0	0.8%
2.0 - 2.5	0.6%
2.5 - 3.0	0.3%
>3.0	1.0%

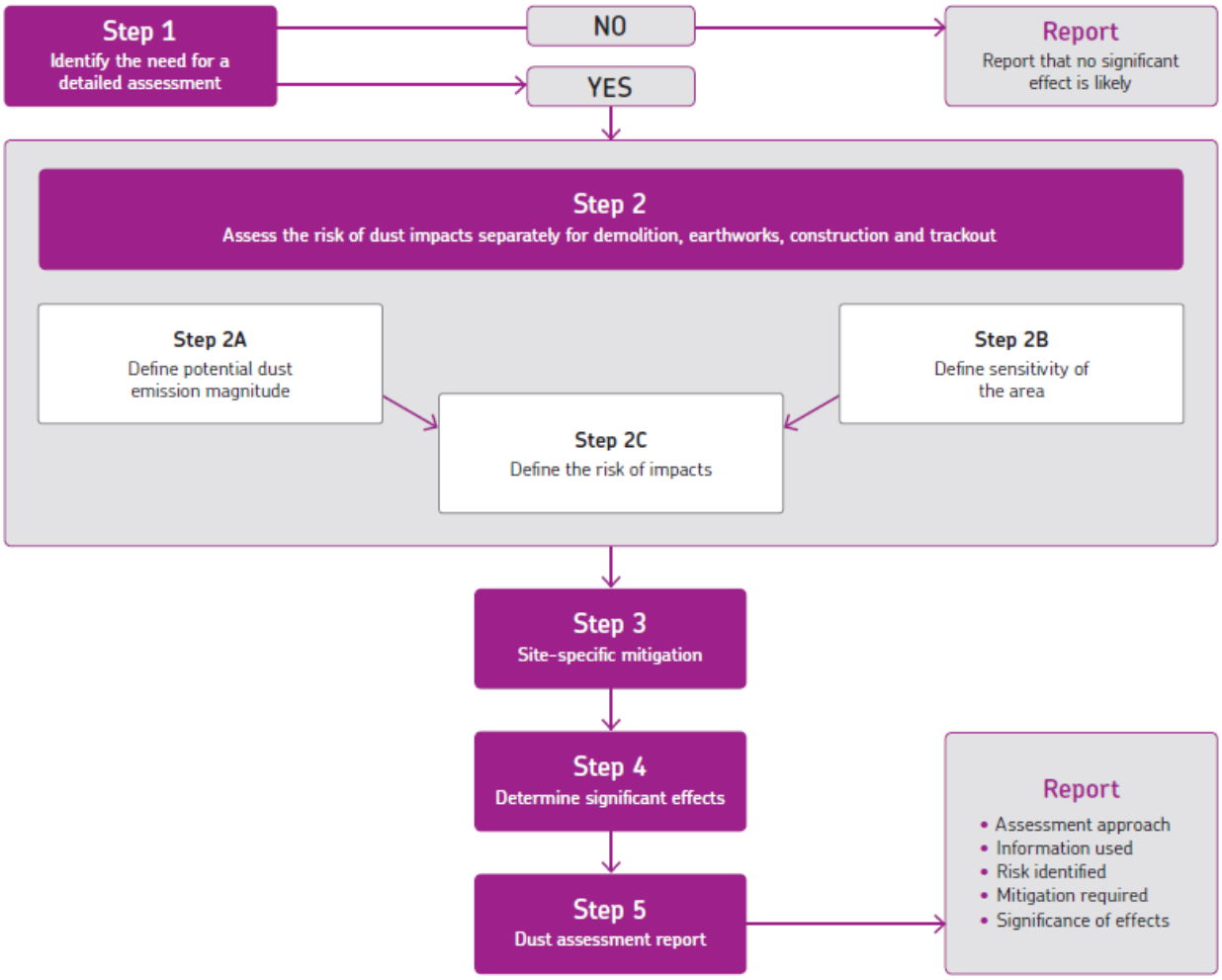
3.4.10 Considering the above wind and rain analysis, the likelihood that the conditions which could lead to dust being emitted due to wind erosion when the wind speed is high enough (i.e. 5.0m/s or higher), and then transported in the air to nearby receptors is likely to be relatively low. For example, for the wind direction which occurs most frequently (i.e. south-southwest) the frequency of winds on dry days above 5.0m/s is only 4.3%, which equates to approximately 16 days in the year (see table 3-2).

3.5 IAQM assessment methodology

Outline of method

3.5.2 The methodology for the assessment of the construction impacts is based on a five-step approach as set out in figure 3-2.

Figure 3-2 Structure of construction dust assessment



Step 1 Identify the need for a detailed assessment

3.5.3 An assessment would be required where there is:

- a human receptor within 350m of the boundary of the Off-Site Power Station Facilities site and/or within 50m of the access route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s); and/or
- an ecological receptor within 50m of the boundary of the Off-Site Power Station Facilities site and/or within 50m of the access route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).

3.5.4 The requirement for a dust risk assessment can be screened out where the above criteria are not met, therefore it can be concluded that the level of risk is Negligible and any effects would be not significant. If there are human or ecological receptors within the distance criteria set out in Step 1, then Steps 2 to 4 should be undertaken, as shown in figure 3-2.

Step 2 Assess the risk of dust impacts

Step 2A Define the potential dust emission magnitude

Demolition

3.5.5 The following are descriptors for the different dust emission magnitudes for demolition:

Large: total building volume greater than 50,000m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities greater than 20m above ground level;

Medium: total building volume 20,000m^3 to 50,000m^3, potentially dusty construction material, demolition activities 10m to 20m above ground level; and

Small: total building volume less than 20,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities less than 10m above ground, demolition during wetter months.

Earthworks

3.5.6 The following are descriptors for the different dust emission magnitudes for earthworks:

Large: total site area greater than 10,000m^2, potentially dusty soil type (e.g. clay, which would be prone to suspension when dry due to small particle size), greater than 10 heavy earth-moving vehicles active at any one time, formation of bunds greater than 8m in height, total material moved greater than 100,000 tonnes;

Medium: total site area 2,500m^2 to 10,000m^2, moderately dusty soil type (e.g. silt), five to 10 heavy earth-moving vehicles active at any one time, formation of bunds 4m to 8m in height, total material moved 20,000 tonnes to 100,000 tonnes; and

Small: total site area less than 2,500m^2, soil type with large grain size (e.g. sand), less than five heavy earth-moving vehicles active at any one time, formation of bunds less than 4m in height, total material moved less than 20,000 tonnes, earthworks during wetter months.

Construction

3.5.7 The following are descriptors for the different dust emission magnitudes for construction:

Large: total building volume greater than 100,000m^3, piling, on-site concrete batching; sandblasting;

Medium: total building volume 25,000m^3 to 100,000m^3, potentially dusty construction material (e.g. concrete), piling, on-site concrete batching; and

Small: total building volume less than 25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

Trackout

3.5.8 Trackout refers to the transport of dust and dirt from the Off-Site Power Station Facilities site onto the public road network, where it may be deposited and re-suspended by other vehicles using the road network. Only receptors within 50m of the route(s) used by vehicles on the public highway up to 500m from the Off-Site Power Station Facilities site entrance(s) are considered to be at risk.

3.5.9 The following are descriptors for the different dust emission magnitudes for trackout:

Large: greater than 50 heavy duty vehicle (HDV) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length greater than 100m;

Medium: 10 to 50 HDV outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m to 100m; and

Small: fewer than 10 HDV outward movements in any one day, surface material with low potential for dust release, unpaved road length less than 50m.

Step 2B Define the sensitivity of the area

3.5.10 The sensitivity of the area takes account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- the local background PM_{10} concentrations; and
- site-specific factors.

3.5.11 For the assessment of the sensitivities of people to dust soiling effects and to the health effects of PM_{10}, the receptors have been identified as 'High', 'Medium' or 'Low' sensitivity based on Box 6 in the IAQM guidance [RD1] as reproduced below.

Sensitivities of people to dust soiling effects

High:

- users can reasonably expect the enjoyment of a high level of amenity; or
- the appearance, aesthetics or value of their property would be diminished by soiling, and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.

Indicative examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.

Medium:

- users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home;
- the appearance, aesthetics or value of their property would be diminished by soiling; or
- the people or property would not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.

Indicative examples include parks and places of work.

Low:

- the enjoyment of amenity would not reasonably be expected;
- property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or
- there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods as part of the normal pattern of use of the land.

Indicative examples include playing fields, farmland (unless it is commercially-sensitive horticultural farmland), footpaths, short-term car parks and roads.

Sensitivities of people to the health effects of PM_{10}

High:

- locations where members of the public are exposed over a period relevant to the Air Quality Objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).

Indicative examples include residential properties. Hospitals, schools and residential care homes (if present) should also be considered as having equal sensitivity to residential areas for the purpose of this assessment.

Medium:

- locations where the people exposed are workers, and exposure is over a period relevant to the Air Quality Objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).

Indicative examples may include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.

Low:

- locations where human exposure is transient.

Indicative examples include public footpaths, playing fields, parks and shopping streets.

Sensitivities of receptors to ecological effects

For the assessment of the sensitivity of the area with regard to impacts on ecological receptors, the relevant ecological receptors have been identified as High, Medium or Low sensitivity as advised in IAQM guidance [RD1], as described below.

High:

- locations with an international or national designation where the designated features may be affected by dust soiling; or
- locations where there is a community of a particularly dust-sensitive species such as vascular species included in the Red Data List for Great Britain [RD9].

Indicative examples include a Special Area of Conservation designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.

Medium:

- locations where there are particularly important plant species, where their dust sensitivity is uncertain or unknown; or
- locations with a national designation where the features may be affected by dust deposition.

An indicative example is a Site of Special Scientific Interest with dust sensitive features.

Low:

- locations with a local designation where the features may be affected by dust deposition.

An indicative example is a Wildlife Site with dust sensitive features.

3.5.12 Table 3-4 and table 3-5 set out the selection criteria for the sensitivity of the area to dust soiling effects on people and property, and the selection criteria for the sensitivity of the area to human health impacts, respectively. Table 3-6 sets out the selection criteria for the sensitivity of the area with regard to impacts on ecological receptors.

Table 3-4 Criteria for the sensitivity of the area to dust soiling effects on people and property

Receptor sensitivity	Number of receptors	Distance from the source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10 – 100	High	Medium	Low	Low
	1 – 10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 3-5 Criteria for the sensitivity of the area to human health

Receptor sensitivity	Annual mean PM_{10} concentration	Number of receptors	Distance from the source (m)				
			<20	<50	<100	<200	<350
High	> 32µg/m^3	>100	High	High	High	Medium	Low
		10 – 100	High	High	Medium	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	28 – 32µg/m^3	>100	High	High	Medium	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	High	Medium	Low	Low	Low
	24 – 28µg/m^3	>100	High	Medium	Low	Low	Low
		10 – 100	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	< 24µg/m^3	>100	Medium	Low	Low	Low	Low
		10 – 100	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Medium	> 32µg/m^3	>10	High	Medium	Low	Low	Low
		1 – 10	Medium	Low	Low	Low	Low
	28 – 32µg/m^3	>10	Medium	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	24 – 28µg/m^3	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
	< 24µg/m^3	>10	Low	Low	Low	Low	Low
		1 – 10	Low	Low	Low	Low	Low
Low	N/A	>1	Low	Low	Low	Low	Low

Table 3-6 Criteria for the sensitivity of the area to ecological impacts

Receptor sensitivity	Distance from the source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

Step 2C Define the risk of impacts

3.5.13 The dust emission magnitude is then combined with the sensitivity of the area to determine the overall risk of impacts with no mitigation measures applied. The matrices in table 3-7 provide a method of assigning the level of risk for each activity. These can then be used to determine the level of mitigation that is required.

Table 3-7 Determination of risk of dust impacts

Sensitivity	Dust emission magnitude		
	Large	Medium	Small
Demolition			
High	High risk	Medium risk	Medium risk
Medium	High risk	Medium risk	Low risk
Low	Medium risk	Low risk	Negligible
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Low risk	Negligible
Low	Low risk	Low risk	Negligible

Step 3 Site-specific mitigation

3.5.14 During the construction phase, it would be important to control dust levels for High, Medium and Low risk construction activities. In order to avoid significant impacts from dust during the construction phase, suitable

mitigation measures should be adopted. Following the identification of a risk category for the demolition, earthworks, construction and trackout activities based on table 3-7, appropriate mitigation measures can be identified. Activities identified as High risk would require a greater level of mitigation than those identified as Low risk.

3.5.15 A selection of these measures has been specified for Low risk to High risk sites in IAQM guidance [RD1] as measures suitable to mitigate dust emissions from activities such as those which would be undertaken during the construction of the Off-Site Power Station Facilities.

Step 4 Determine significant effects

3.5.16 Following Step 2 (identification of the risk of dust effects occurring for each activity), and Step 3 (identification of appropriate site-specific mitigation), the significance of the potential dust effects can be determined. The recommended mitigation measures are considered to be sufficient based on the successful application of these measures at other large construction sites to reduce emissions of dust, such that a significant effect would not occur at off-site receptors.

3.5.17 The approach in Step 4 of IAQM dust assessment guidance [RD1] has been adopted to determine the significance of effects with regard to dust emissions. The guidance states the following:

> "For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be not significant."

3.5.18 IAQM guidance also states that:

> "Even with a rigorous DMP [Dust Management Plan] in place, it is not possible to guarantee that the dust mitigation measures will be effective all the time, and if, for example, dust emissions occur under adverse weather conditions, or there is an interruption to the water supply used for dust suppression, the local community may experience occasional, short-term dust annoyance. The likely scale of this would not normally be considered sufficient to change the conclusion that with mitigation the effects will be not significant."

3.5.19 Step 4 of IAQM guidance [RD1] recognises that the key to the above approach is that it assumes that the regulators, such as the IACC and NRW, ensure that the proposed mitigation measures are implemented. The management plan should include the necessary systems and procedures to facilitate regular checking by the regulators to ensure that mitigation is being delivered, and that it is effective in reducing any residual effect to not significant in line with the guidance.

4 Step 1 Identify the need for a detailed assessment

4.1.1 An assessment of potential demolition and construction impacts was undertaken in accordance with IAQM methodology as described earlier and as set out in section 3. The first step is Step 1, where the need for a detailed assessment is determined based on the location of receptors within the vicinity of the Off-Site Power Station Facilities site.

4.1.2 There are human receptors within 350m of the boundary of the Off-Site Power Station Facilities site and, therefore, further assessment is required. A count of the relevant human receptors within the specified assessment bands was carried out as recommended in IAQM guidance [RD1], the results of which are set out in table 4-1. The receptors have been identified as being of High, Medium or Low sensitivity based on the criteria set out in paragraph 3.5.11. A figure of the relevant receptors within the assessment bands for dust soiling from the boundary of the Off-Site Power Station Facilities site is provided in figure 9-1 (see section 9 of this report).

4.1.3 As per IAQM guidance [RD1], high sensitivity receptors presented in table 4-1 include the approximate number of pupils and staff attending Llanfaethlu Primary School (up to 180 pupils and staff).

4.1.4 There are five footpaths (four footpaths identified as Public Rights of Way and one identified using aerial photography) in close proximity to the Off-Site Power Station Facilities site. These have been included in the receptor count as a Low sensitivity as per the criteria set out in 3.5.11 and are shown in figure 9-1 (see section 9 of this report).

4.1.5 The assessment has demonstrated that there are human receptors (i.e. residential properties or commercial premises) within 50m of the local road network up to 500m from the site entrance, which would be utilised during the Off-Site Power Station Facilities works. These receptors are set out in table 4-1 and are displayed in figure 9-1 (see section 9 of this report).

Table 4-1 Dust soiling and human health receptor count

Receptor count				
Demolition, earthworks and construction		**Receptor sensitivity**		
		High	**Medium**	**Low**
Distance from boundary of the Off-Site Power Station Facilities Site	<20m	5	0	2
	<50m	6	0	3
	<100m	9	0	3
	<350m	212	3	6
Trackout		**High**	**Medium**	**Low**
Distance from roads up to 500m from the Off-Site Power Station Facilities Site exit	<20m	9	0	4
	20m–50m	182	0	0

4.1.6 The effects of construction dust on ecological sites have also been considered. The absence of any relevant ecological sites within 50m of the boundary of the Off-Site Power Station Facilities site, or relevant ecological sites within 50m of the route(s) used by construction vehicles up to 500m from the site entrance(s), meant the potential effects of construction dust on ecological sites was not required to be considered further. The nearest ecological receptors are the Llyn Garreg-Lwyd Site of Special Scientific Interest, an area of ancient woodland and the Coed Carreglwyd Wildlife Site which are located approximately 700m to the northwest of the site.

5 Step 2 Assess the risk of dust impacts

5.1 Step 2A Define the potential dust emission magnitude

5.1.1 The works associated with the construction of the Off-Site Power Station Facilities would be split into several stages, which could potentially involve different periods of demolition, earthworks, construction, trackout and activity levels of which would not necessarily peak simultaneously.

5.1.2 The dust emission magnitudes of each activity have been specified with reference to the definitions of dust emission magnitudes in section 3.5 and using professional judgement in line with IAQM guidance [RD1]. These are summarised below.

Demolition: The Off-Site Power Station Facilities site encompasses developed land comprising a former bus depot that is currently being used as a garage and for vehicle parking. It would involve the demolition of two existing commercial garages, a motor vehicle repair building, associated infrastructure and a dwelling adjacent to the proposed site entrance. The demolition volume is estimated to be approximately 7,400m^3 and demolition activities would generally be less than 10m above ground. There would be on-site crushing activities. The demolition material may be potentially dusty (e.g. concrete). The proposed demolition activities would ordinarily be based on a dust emission class of 'Small'. However, as per IAQM guidance [RD1], the requirement for on-site crushing equipment means it is appropriate to increase the dust emission magnitude by one class. Therefore, the assessment for demolition is based on a dust emission class of 'Medium'.

Earthworks: The total amount of material to be excavated or moved is estimated to be less than 30,000 tonnes and there is unlikely to be a relatively large amount of heavy earth-moving equipment active at any one time (i.e. typically fewer than 10 machines). A desk-based review suggests the soil profile comprises clay which may be prone to suspension when dry due to its small particle size. Although the site area is approximately 21,250m^2, given the material quantity and scale of plant and machinery usage, the assessment for earthworks is based on a dust emission class of 'Medium'.

Construction: The construction required for the Off-Site Power Station Facilities includes the MEEG/AECC building, ESL building, staff car park (allowing parking for up to 13 vehicles), substation and external plant compound. The construction stage would utilise potentially dusty

construction materials such as concrete. The total building volume is approximately 20,000m^3 and on-site batching or sandblasting activities are not anticipated. On this basis, the assessment for construction is based on a dust emission class of 'Small'.

Trackout: During the construction phase, the maximum number of outward movements of HDVs is anticipated to be approximately 24 in any one day. On this basis, the assessment for trackout is based on a dust emission class of 'Medium'.

5.1.3 Table 5-1 presents the dust emission magnitude for each activity based on the criteria set out in section 3.5.

Table 5-1 Dust emission magnitude

Activity	Dust emission magnitude
Demolition	Medium
Earthworks	Medium
Construction	Small
Trackout	Medium

5.2 Step 2B Define the sensitivity of the area

5.2.1 The Off-Site Power Station Facilities site is bounded by the A5025 to the west, residential and storage buildings to the north and farmland to the south and east. There are a number of residential properties within 50m to the north, northeast and southwest of the site. There is also a Public Right of Way located immediately opposite the Off-Site Power Station Facilities site within 10m of the site boundary (as represented by the Order Limits – see figure 9-1). Furthermore, Llanfaethlu Primary School which is approximately 120m to the southwest of the Off-Site Power Station Facilities site opened in autumn 2017. If the works associated with the construction of the Off-Site Power Station Facilities were to produce excessive dust emissions, it is possible that significant impacts would be experienced at these sensitive receptors if suitable mitigation measures were not employed. The hourly sequential meteorological data as described in section 3.4 shows that the predominant wind directions are from the south-southwest and southwest. This means that, on average, receptors to the north-northeast and northeast of the Off-Site Power Station Facilities site would be most susceptible to any potential fugitive dust emissions from the activities as described in section 5.1.

5.2.2 Table 5-2 displays the sensitivities of the surrounding area to demolition, earthworks, construction and trackout based on the criteria set out in table 3-4 and table 3-5, numbers of receptors within certain distance bands of the Off-Site Power Station Facilities site (see table 4-1) and existing PM_{10} concentrations. The IAQM guidance [RD1] recommends that the receptor distance is based on the distance from the source rather than the site boundary. This assessment was undertaken on the basis that all activities

(i.e. demolition, earthworks, construction and trackout) take place at the construction boundary of the Off-Site Power Station Facilities site. This represents a conservative assumption, as in practice most activities would not take place at the site boundary, thus increasing the distance between the source and the receptor.

Table 5-2 Sensitivity of the area (human receptors)

Potential Impact	Sensitivity of the surrounding area			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	Medium	Medium	Medium	High
Human health	Low	Low	Low	Low

5.2.3 Table 5-2 shows that (based on the receptor sensitivity of High, the background PM_{10} concentration and the number of receptors within proximity of the Off-Site Power Station Facilities site), for dust soiling impacts, the sensitivity of the area is categorised as Medium for all stages of the development with the exception of trackout, for which sensitivity is categorised as High due to the location of Llanfaethlu Primary School less than 50m from the carriageway of the A5025. For human health impacts, the sensitivity of the area is categorised as Low for all stages of the development.

5.3 Step 2C – Define the risk of impacts

5.3.1 Using the dust emission magnitudes for the various activities in table 5-1 and the sensitivity of the area provided in table 5-2, the level of risk for each activity is provided in table 5-3 for dust soiling and human health impacts.

Table 5-3 Summary of the dust risks for human receptors

Potential impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	Medium Risk	Medium Risk	Low Risk	Medium Risk
Human health	Low Risk	Low Risk	Negligible Risk	Low Risk

5.3.2 The results in table 5-3 indicate that for potential dust soiling impacts, there is predicted to be a Medium risk from demolition, earthworks and trackout activities and a Low risk from construction activities.

5.3.3 The results in table 5-3 also indicate that for potential human health impacts at sensitive human receptors, there is predicted to be a Low risk from demolition, earthworks and trackout activities and a Negligible risk from construction activities.

5.4 Summary

5.4.1 The results in table 5-3 indicate that there would be a Medium risk to sensitive human receptors with regard to dust soiling effects from demolition, earthworks and trackout activities and a Low risk from construction activities. It would therefore be necessary to adopt an appropriate level of good

practice mitigation measures to reduce the risks of causing a significant effect to amenity or human health.

5.4.2 Although the results in table 5-3 indicate that there would be Low to Negligible risk to sensitive receptors with regard to human health effects, the proposed mitigation measures would be developed from the Medium risk identified for dust soiling effects. This would also prevent or reduce potential dust or PM_{10} (and $PM_{2.5}$) emissions which are associated with health effects such as exacerbating existing conditions including asthma and other lung conditions.

5.4.3 The proposed mitigation measures are set out in section 6.

6 Step 3 Off-Site Power Station Facilities site-specific mitigation

6.1 Recommended mitigation measures

6.1.1 The results in section 5 indicate that the Off-Site Power Station Facilities works are a Medium risk for dust soiling impacts and a Low risk for human health impacts. Good practice mitigation measures would be needed to reduce the potential for dust emissions to potentially lead to significant dust effects in the vicinity of the Off-Site Power Station Facilities site. The suggested good practice mitigation measures which should be adopted for the construction of the Off-Site Power Station Facilities are set out below.

6.1.2 The mitigation measures have been derived from those specified in the IAQM guidance [RD1] and where possible at this stage, adapted to the activities associated with the Off-Site Power Station Facilities works. Measures such as those specified in the guidance would normally be sufficient to reduce construction dust nuisance, risks to human health or effects on ecological sites to a not significant effect. These measures are listed in table 6-1 to table 6-6 with a recommendation as to whether or not they should be applied based on the risk levels identified in the dust assessment. Some specific comments or observations have been added or amendments to the text undertaken, where appropriate. Some of the mitigation measures listed within IAQM guidance for trackout (mitigation numbers 44, 46, 47 and 48) were considered to represent general on-site activities and operation of haul roads, and were moved to the 'Operations' section (see table 6-2) of the general mitigation measures required for all sites. The general mitigation measures were specified based on their highest risk category (i.e. based on the Medium risk to human receptors from dust soiling) as recommended by IAQM guidance [RD1].

6.1.3 As specified above, the measures to control dust emissions taken forward from this assessment, derived from the highly recommended or desirable measures (see table 6-1 to table 6-6), and the monitoring of the effectiveness of the mitigation, would be included in the air quality management strategy set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9). These would be delivered during construction.

6.1.4 When applying the mitigation measures, IAQM guidance [RD1] states the following:

> "The most important aspects of the Dust Management Plan are assigning responsibility for dust management to an individual member of staff of the principal contractor, training staff to understand the importance of the issue, and communicating with the local community. Good dust management practices implemented at high risk sites have resulted in no or minimal complaints, which illustrates the value of the recommended approach."

6.1.5 The mitigation measures set out in table 6-1 to table 6-6 do not specifically include assigning responsibility for dust management to a staff member or training staff on the importance of dust management and awareness of dust issues. However, these would be included within the proposed mitigation measures.

6.1.6 For use of on-site crushing equipment required during demolition activities, all crushing equipment would be designed and operated in accordance with the most recent version of the Process Guidance Note 3/16 [RD10] for mobile crushing and screening, where relevant.

Table 6-1 Mitigation for the Off-Site Power Station Facilities site: communications

Mitigation measure	Highly recommended/ Desirable/Not required
1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on the Off-Site Power Station Facilities site.	Highly recommended
2. Display the name and contact details of person(s) accountable for air quality and dust issues on the Off-Site Power Station Facilities site boundary. This may be the environment manager/engineer or the site manager.	Highly recommended
3. Display the head or regional office contact information.	Highly recommended *Display the Horizon Enquiries number or address*

Table 6-2 Mitigation for the Off-Site Power Station Facilities site: dust management

Mitigation measure	Highly recommended/ Desirable/Not required
4. Develop dust mitigation and control measures as part of the air quality management strategies as set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9) and implement these on-site through an appropriate management plan which is derived from the approved Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9). This may also include measures to control other pollutant emissions. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this assessment. The desirable measures should be included as appropriate for the Off-Site Power Station Facilities site.	Highly recommended
Site management	
5. 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.	Highly recommended
6. Make the complaints log available to the local authority when asked.	Highly recommended
7. Record any exceptional incidents that cause dust and/or air emissions, either on-site or off-site, and the action taken to resolve the situation in the log book.	Highly recommended
8. Hold regular liaison meetings with other high-risk construction sites within 500m of the Off-Site Power Station Facilities site boundary to ensure plans are coordinated, 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.	Not required
Monitoring	

Mitigation measure	Highly recommended/ Desirable/Not required
9. Undertake daily on-site and off-site inspection where receptors (including roads) are nearby, to monitor dust and record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the Off-Site Power Station Facilities site boundary with cleaning to be provided if necessary.	Desirable
10. Carry out regular site inspections to monitor compliance with the management plan, record inspection results and make an inspection log available to the local authority when asked.	Highly recommended
11. 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.	Highly recommended
12. Agree dust deposition, dust flux or real-time PM_{10} continuous monitoring locations with the local authority. Where possible, commence baseline monitoring at least three months before work commences on-site or, if at a large site, before work on a phase commences. Further guidance is provided by IAQM [RD11] on monitoring during demolition, earthworks and construction (see section 6.2).	Highly recommended
Preparing and maintaining the site	
13. Plan site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible.	Highly recommended
14. Erect solid screens or barriers around dusty activities, or the Off-Site Power Station Facilities site boundary, which are at least as high as any stockpiles on-site.	Highly recommended
15. Fully enclose site or specific operations where there is a high potential for dust production and the Off-Site Power Station Facilities site is active for an extensive period.	Highly recommended
16. Avoid site runoff of water or mud.	Highly recommended
17. Keep Off-Site Power Station Facilities site fencing, barriers and scaffolding clean using wet methods.	Highly recommended

Mitigation measure	Highly recommended/ Desirable/Not required
18. Remove materials that have a potential to produce dust from the Off-Site Power Station Facilities site as soon as possible, unless being re-used on-site. If they are being re-used on-site, cover as described below.	Highly recommended
19. Cover, seed or fence stockpiles to prevent wind whipping.	Highly recommended
Operating vehicle/machinery and sustainable travel	
21. Ensure all vehicles switch off engines when stationary – no idling vehicles.	Highly recommended
22. Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	Highly recommended
23. Impose and signpost a maximum speed limit of 15mph on surfaced and 10mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	Desirable
24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	Highly recommended *As part of the DCO application, the measures to manage/mitigate the effects of constructing the Off-Site Power Station Facilities will be covered within the traffic and transport management strategy as set out in the wider Wylfa Newydd CoCP (Application Reference Number: 8.6)*

Mitigation measure	Highly recommended/ Desirable/Not required
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car sharing).	Desirable *As part of the DCO application, the measures to manage/mitigate the effects of constructing the Off-Site Power Station Facilities will be covered within the traffic and transport management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9)*
Operations	
26. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	Highly recommended
27. Ensure an adequate water supply on the Off-Site Power Station Facilities site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	Highly recommended
28. Use enclosed chutes and conveyors and covered skips.	Highly recommended
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Highly recommended
30. Ensure equipment is readily available on-site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	Highly recommended
44. Avoid dry sweeping of large areas.	Highly recommended
46. Inspect on-site haul routes for integrity and instigate any necessary repairs to the surface as soon as reasonably practicable.	Highly recommended

Mitigation measure	Highly recommended/ Desirable/Not required
47. Record all inspections of haul routes and any subsequent action in a site log book.	Highly recommended
48. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers, and regularly cleaned.	Highly recommended
Waste management	
31. No burning of waste, materials or refuse on the Off-Site Power Station Facilities site at any time.	Highly recommended

Table 6-3 Mitigation measures specific to demolition

Mitigation measure	Highly recommended/ Desirable/Not required
32. Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	Desirable
33. Ensure effective water suppression is used during demolition operations. Hand-held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high-volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	Highly recommended
34. Avoid explosive blasting, using appropriate manual or mechanical alternatives.	Highly recommended
35. Bag and remove any biological debris or damp down such material before demolition.	Highly recommended

Table 6-4 Mitigation measures specific to earthworks

Mitigation measure	Highly recommended/ Desirable/Not required
36. Revegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	Desirable
37. Use hessian fabric, mulches or tackifiers where it is not possible to revegetate or cover with topsoil, as soon as practicable.	Desirable
38. Only remove the cover in small areas during work and not all at once.	Desirable

Table 6-5 Mitigation measures specific to construction

Mitigation measure	Highly recommended/ Desirable/Not required
39. Avoid scabbling (roughening of concrete surfaces) if possible.	Desirable
40. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	Desirable
41. 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.	Not required
42. For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.	Not required *Recommended as best practice*

Table 6-6 Mitigation measures specific to trackout

Mitigation Measure	**Highly recommended/ Desirable/Not required**
43. Use water-assisted dust sweeper(s) on the access and local roads to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	Highly recommended
45. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	Highly recommended
49. Implement a wheel-washing system (with rumble grids to dislodge accumulated dust and mud) prior to leaving the site where reasonably practicable.	Highly recommended
50. Ensure there is an adequate area of hard surfaced road between the wheel-wash facility and the site exit, wherever site size and layout permit.	Highly recommended
51. Access gates to be located at least 10m from receptors where possible.	Highly recommended

6.2 Air quality monitoring

6.2.1 As the works have been categorised as a Medium risk, an appropriate monitoring survey, as recommended in table 6-2, would be undertaken to form a key part of the overall dust mitigation and management process. The approach and scope of the air quality monitoring survey would be informed by the IAQM guidance on monitoring near demolition and constructions sites [RD11] and would likely include dust deposition monitoring using passive dust deposition gauges. Supplementary monitoring of weather conditions including wind speed, wind direction and rainfall would be undertaken.

6.2.2 The IAQM monitoring guidance [RD11] states that:

"Monitoring may be carried out in order to fulfil a number of objectives:

- *To ensure that the construction activities do not give rise to any exceedances of the air quality objectives/limit values for PM_{10} and/or $PM_{2.5}$, or any exceedances of recognised threshold criteria for dust deposition/soiling;*
- *To ensure that the agreed mitigation measures to control dust emissions are being applied and are effective;*
- *To provide an "alert" system with regard to increased emissions of dust, and a trigger for cessation of site works or application of additional abatement controls;*
- *To provide a body of evidence to support the likely contribution of the site works in the event of complaints; and*

- *To help to attribute any high levels of dust to specific activities on-site in order that appropriate action may be taken."*

6.2.3 Although the proposed monitoring system will not provide a real-time "alert" system, the results of the dust deposition monitoring (based on the monthly dust deposition sampling results) would be reviewed to identify if the agreed thresholds have been exceeded, and if investigation and additional mitigation is required to reduce dust emissions from site activities (or even if site activities needs to be altered or temporarily suspended).

6.2.4 The scope of the monitoring discussed in this section and the basis for setting appropriate thresholds for identifying potentially unacceptable dust soiling at human receptors would be included as part of the air quality management strategy set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9).

7 Step 4 determine significant effects

7.1.1 The assessment has identified that there are potentially sensitive dust receptors located near to the Off-Site Power Station Facilities site boundary (see figure 9-1), including residential properties and a primary school in Llanfaethlu. There are nine high sensitivity receptors located within 100m of the Off-Site Power Station Facilities site, including five high sensitivity receptors located within 20m (see table 4-1). The receptor locations are reported from the site boundary and not the actual location of activities with the potential to generate dust and the distances used in the assessment are therefore cautious, as activities with high potential to generate dust (including PM_{10} and $PM_{2.5}$) would be offset from the boundary. The sensitivity of the area, which takes into consideration the number and distance of receptors from the site and baseline conditions, are summarised in table 5-2 as being Low sensitivity with respect to emissions of PM_{10} and $PM_{2.5}$ and Medium to High sensitivity with respect to changes in dust deposition rates and associated effects on amenity.

7.1.2 Consideration of the meteorological conditions experienced within the study area (section 3.4) has identified that there is the potential for dust generated on-site to be blown towards receptors on all sides of the Off-Site Power Station Facilities site, with the receptors located to the east and north east being downwind more frequently. The scale of the proposed works has been used to judge the dust emission magnitude, as being Medium dust emission magnitude for demolition, earthworks and trackout activities, and as being of Small dust emission magnitude for construction activities (table 5-1).

7.1.3 Based on the matrix of relationships between the sensitivity of the area and the dust emission magnitude, it is considered that the proposed demolition, earthworks, and trackout activities are predicted to be a Low risk (see table 5-3) as there is limited potential for emissions of PM_{10} and $PM_{2.5}$ to increase baseline concentrations to a value that is above the air quality objective values set for the protection of human health. For potential dust soiling effects, there is predicted to be a Medium risk from demolition, earthworks and trackout (see table 5-3). There is the potential for infrequent, short-term episodes when baseline dust deposition rates could be increased by an amount that residents could perceive. There is a Low risk from construction activities to cause significant dust soiling effects.

7.1.4 The adoption of good practice dust mitigation measures to manage the generation of emissions at source will therefore be required, as proposed in the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9).

7.1.5 There are mitigation methods already available that have been successfully applied on other schemes to manage emissions of dust so that significant off-site effects have not occurred. Such measures are considered to be no more than normal good practice that would be adopted by any contractor meeting the requirements of the Wylfa Newydd CoCP (Application

Reference Number: 8.6) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9). It is considered that there are no potentially dust generating activities proposed that could not be managed using normal good practices [RD1] so as to prevent significant effects at any offsite receptor, including those located within 20m of the boundary.

7.1.6 This should be considered in conjunction with the analysis of local climatic conditions (see section 3.4) which shows that the likelihood of dust being emitted by wind erosion and being transported to off-site receptor locations is relatively low.

7.1.7 IAQM guidance [RD1] notes that with the application of good practice mitigation measures of the type available for use on this project, the environmental effect will not be significant at any off-site receptor. IAQM guidance [RD1] also notes that, even with a rigorous package of mitigation measures in place, such as those taken forward from this assessment and included as part of the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9), occasional impacts may occur. The Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Off-Site Power Station Facilities sub-CoCP (Application Reference Number: 8.9) provides a framework by which the level of mitigation is adapted to respond proactively to the changing risk of dust emissions, so that significant effects are prevented.

8 References

Table 8-1 Schedule of references

ID	Reference
RD1	Institute of Air Quality Management (IAQM). 2016. *Guidance on the Assessment of Dust from Demolition and Construction Version 1.1*. London: Institute of Air Quality Management.
RD2	British Standards Institution. 1994. *BS 6069-2 Characterisation of Air Quality. Glossary*, 94th Edition, 15 August 15, 1994. London: British Standards Institution.
RD3	The Scottish Office. 1998. *Planning Advice Note PAN 50 Annex B, Controlling the Environmental Effects of Surface Mineral Workings, Annex B: The Control of Dust at Surface Mineral Workings*. Edinburgh: The Scottish Office Development Department.
RD4	Arup. 1995. *The Environmental Effects of Dust from Surface Mineral Workings*. PECD 7/1/468. Report on behalf of the Department of the Environment. London: HMSO
RD5	Isle of Anglesey County Council (IACC). *2014 Air Quality Progress Report for Isle of Anglesey County Council*. Isle of Anglesey County Council, Llangefni.
RD6	The Isle of Anglesey County Council. 2017. Air quality monitoring data provided in an email from the IACC on 08 March 2017.
RD7	Vallack, H. W. Shillito, D. E. 1998. Suggested guidelines for deposited ambient dust. *Atmospheric Environment*, Vol. 32, No. 16, 08.1998, pp. 2737-2744.
RD8	Environment Agency. 2003. *Assessment of noise disturbance upon birds and dust on vegetation and invertebrate species*. Report Ref. 6502-E.075EA.
RD9	Cheffings, C.M. and Farrell, L. (Eds.), Dines, T.D., Jones, R.A., Leach, S.J., McKean, D.R., Pearman, D.A., Preston, C.D., Rumsey, F.J., Taylor, I. 2005. *The Vascular Plant Red Data List for Great Britain*. Species Status 7: 1-116. Peterborough: Joint Nature Conservation Committee.
RD10	Department for Environment Food and Rural Affairs. 2012. *Process Guidance Note 3/16(12) Statutory guidance for mobile crushing and screening*, September 2012.
RD11	Institute of Air Quality Management. 2012. *Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites*. London: Institute of Air Quality Management.

9 Figures

Figure 9-1 Construction dust assessment study areas and human and ecological receptors

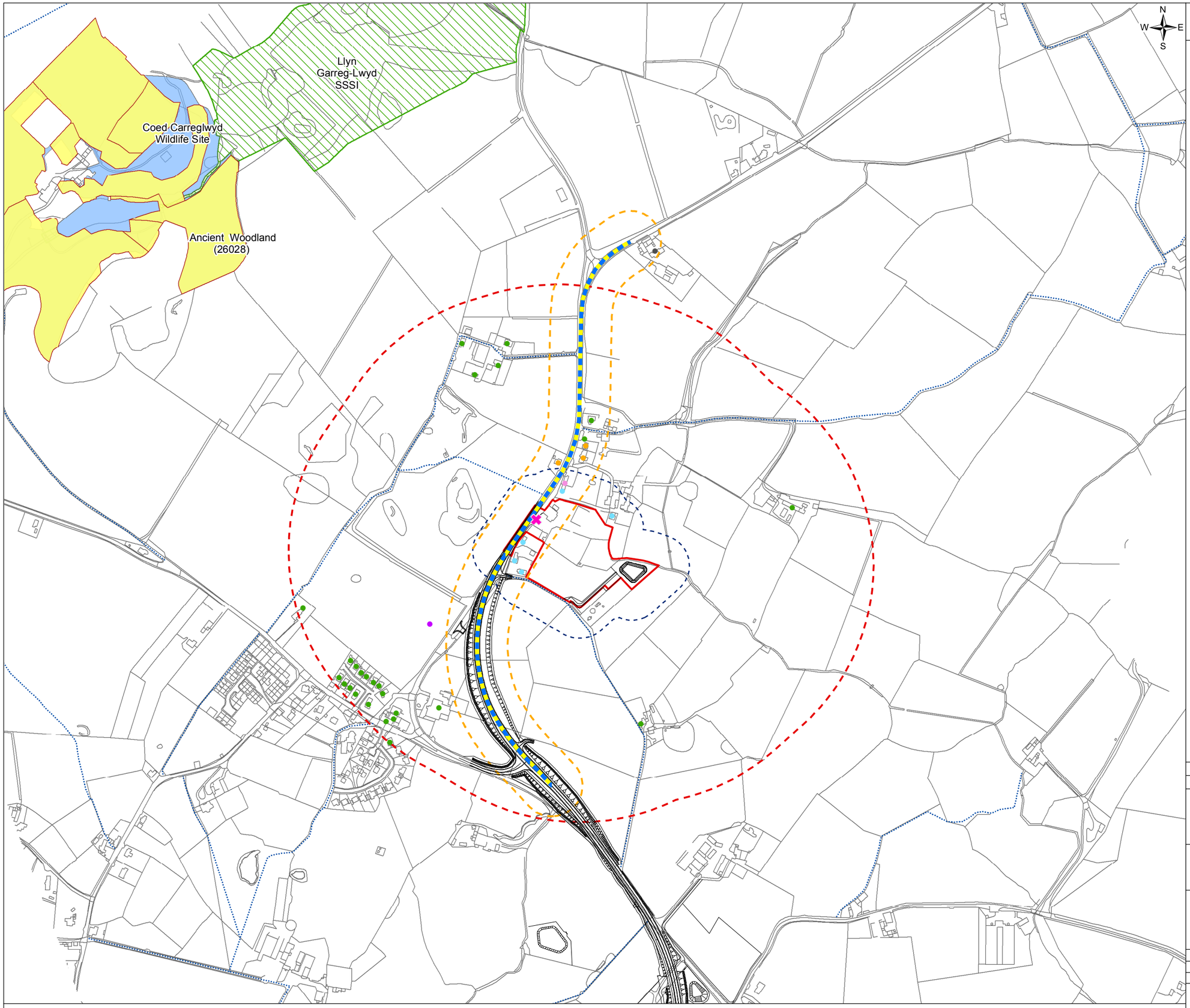


FIGURE 9-1

Legend

- Off-Site Power Station Facilities order limit
- Construction dust assessment study area for ecological receptors (50m from the Off-Site Power Station Facilities)
- Construction dust assessment study area for human receptors (350m from the Off-Site Power Station Facilities)
- Construction dust assessment study area (50m from the route(s) used by construction vehicles up to 500m from the site entrance)
- Public Rights of Way
- A5025 Off-line Highway Improvements - Section 5
- Site entrance
- Access route up to 500m from the site entrance

Off-Site Power Station Facilities human receptor locations

- 0-20m
- 20-50m
- 50-100m
- 100-350m
- Outside 350m but within 50m of access road
- Approximate location of Llanfaethlu Primary School

Ecological receptor

- Site of Special Scientific Interest (SSSI)
- Wildlife Site
- Ancient Woodland

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
1.0	MAR 18	DCO submission	HNPWL	HNPWL	HNPWL	HNPWL

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT
ENVIRONMENTAL STATEMENT

Drawing Title: CONSTRUCTION DUST ASSESSMENT STUDY AREAS AND HUMAN AND ECOLOGICAL RECEPTORS

Scale @ A3	1:6,000	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.		

Drawing No.: 60PO8077_DCO_VOL_E_APP_05_01_09_01

0 50 100 200 300 400 500 Metres