HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

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Major construction sites can give rise to increased long-term and short-term particulate matter concentrations at both on-site and 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 impacts of dust from the works associated with the construction of the Wylfa Newydd Power Station (hereafter referred to as 'Main Construction') have therefore been evaluated in this assessment.

The results of the dust assessment indicate that at sensitive human receptors there is predicted to be a High risk from earthworks and construction activities and a Medium risk from demolition and trackout activities for dust soiling effects. All activities are predicted to be a Low risk for potential human health effects with regard to the assessment method set out in Institute of Air Quality Management (IAQM) guidance [RD1] and compliance with the Air Quality Objectives (AQOs) for PM_{10} and $PM_{2.5}$.

The results for the ecological receptors indicate that at the Tre'r Gof Site of Special Scientific Interest (SSSI) and Cae Gwyn SSSI, there is predicted to be a high risk from earthworks and construction activities. This is due to the identification of vegetation on the site which is particularly sensitive to dust deposition and soiling, notably ferns and mosses. For the Ancient Woodland and Arfordir Mynydd y Wylfa - Trwyn Penrhyn (Wylfa Head) Wildlife Site within the Wylfa Newydd Development Area and Trwyn Pencarreg Wildlife Site, demolition, earthworks and construction are considered a Low risk, while trackout activities represent a Negligible risk.

Based on experience of the application of existing mitigation methods at other major construction sites it is considered that all High, Medium and Low dust 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.

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 in the Wylfa Newydd Code of Construction Practice (Wylfa Newydd CoCP) (Application Reference Number: 8.6) and Power Station Main Site sub-CoCP (Application Reference Number: 8.7).

IAQM guidance [RD1] notes that with the application of good practice mitigation measures of the type available for use during Main Construction, the environmental effect would not be significant at any on-site and 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 Power Station Main Site sub-CoCP (Application Reference Number: 8.7), occasional impacts may occur. The Wylfa Newydd CoCP (Application Reference Number: 8.6) and Power Station Main Site sub-CoCP (Application Reference Number: 8.7) provide 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.

The appraisal of the potential dust emissions from activities associated with Main Construction shows that dust is likely to be generated from site activities and there would be a High risk of impacts to human and ecological receptors. However, it is considered that all risks could be managed effectively 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 adjacent receptors, and the effect would be not significant.

1 About this report

1.1 Purpose and applicability

1.1.1 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 that could potentially be emitted to air from the activities associated with Main Construction.

1.2 Terms and definitions

Table 1-1 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.
Candidate Special Area of Conservation (cSAC)	A site that has been submitted to the European Commission to be considered for designation under the Habitats Directive but which has not yet been formally designated.
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.

Term	Definition
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 from the definition given in BS 6069-2:1994, where dust refers to particles up to 75µm in diameter [RD2].
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.

Term	Definition
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.
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.

Term	Definition
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 their 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 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.
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).
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).
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.

Term	Definition
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.
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.
Special Protection Area (SPA)	Sites designated under the Birds Directive due to their international importance for the breeding, feeding, wintering, or the migration of rare and vulnerable species of birds.

Term	Definition
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 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.

1.3 Responsible parties

Table 1-2 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.

Responsible party	Description
Isle of Anglesey County Council (IACC)	The local authority governing the area within which the Power Station is intended to be constructed.
Jacobs UK Ltd (Jacobs)	Consultants appointed by Horizon to undertake the Environmental Impact Assessment for the Wylfa Newydd DCO 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.

1.4 Scope

1.4.1 This report sets out the assessment of emissions of dust that could potentially occur from Main Construction. 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.

2 Assessment methodology

2.1 Introduction

2.1.1 Activities carried out on construction sites can give rise to emissions of dust that could cause annoyance 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 Main Construction therefore need to be assessed in order to identify the required mitigation measures.

2.1.2 The assessment of dust during construction has been carried out using a qualitative risk-based appraisal with reference to the location of the Wylfa Newydd Development Area in relation to sensitive locations, the planned process and site characteristics, as described in IAQM guidance [RD1].

2.1.3 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} faction.

2.2 Potential sources

2.2.1 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.

2.2.2 There are potentially sensitive locations close to or within the Wylfa Newydd Development Area, including residential receptors, workplace receptors and ecological sites. Activities associated with Main Construction have the potential to produce emissions of dust that could be transported towards receptors by the wind. These are either within or close enough to the site boundary that without mitigation measures, they could perceive increases in the rate of dust deposition to property surfaces.

2.2.3 The activities associated with the construction of the Power Station are described in detail in chapter D1 (proposed development) (Application Reference Number: 6.4.1) 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 the IAQM dust assessment method [RD1] of demolition, earthworks, construction and trackout. These are described below:

- Demolition activities: Demolition of the majority of buildings and structures within the Wylfa Newydd Development Area (including the processing and storage of material associated with the demolition and removal of vegetation, walls and other boundary features) is anticipated to occur during SPC. However, as a requirement of the Development Consent Order, the full scope of SPC works is to be included in this assessment. Therefore, demolition activities during Main Construction would include demolition of all buildings and structures within the Wylfa Newydd Development Area, including the processing and storage of material associated with the demolition and removal of walls and other boundary features.
- Earthworks: Prior to Main Construction, the main earthworks required for the SPC works relate to remediation of contaminated areas identified across the site including excavation of the contaminated soils and formation and use of the remediation processing compound. Other earthworks would be required for establishing some of the satellite compounds and extending an existing, or forming a new, access track. For Main Construction, the main earthworks activities would include topsoil stripping, bulk earth and rock excavations for the UK ABWR buildings and structures, site levelling and grading to form required building platforms, construction and laydown areas, formation of landscape mounds and backfill around nuclear classified structures. Another source would be 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: Prior to Main Construction, construction of the buildings/infrastructure and associated activities relating to the construction of the main site compounds and remediation processing plant. For Main Construction, activities include construction of the Power Station, construction stage areas and facilities, the MOLF, the Site Campus at Wylfa Head and associated infrastructure and ancillary facilities.
- Vehicle movement and trackout: This includes vehicles moving in and around the Wylfa Newydd Power Station emitting exhaust particulate matter and re-suspending loose material on the road. There would be the potential for spillage from transferring material around the Wylfa Newydd Development Area 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.

2.2.4 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 Wylfa Newydd Development Area. 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 Power Station Main Site sub-CoCP (Application Reference Number: 8.7).

2.2.5 Larger dust particles (greater than 30µm) make up the greatest proportion of dust emission from mineral workings or earthworks and would 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 small proportion (approximately 10%) of dust emitted from most workings and the emissions become diluted as they disperse down-wind [RD4].

2.3 Baseline conditions

2.3.1 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 conditions. This concentration was recorded by the IACC during 2016 at a location adjacent to the Wylfa Newydd Development Area. 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 and emissions from construction plant, machinery and marine vessels which are anticipated to occur during Main Construction was included using dispersion modelling as provided in chapter D5 (air quality (excluding emissions from traffic)) (Application Reference Number: 6.4.5) of the Environmental Statement. This resulted in a maximum predicted total PM_{10} concentration of 15.7µg/m^3 at any of the relevant receptors 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. Details of the dispersion modelling of emissions from construction plant, machinery and marine vessels are provided in chapter D5 (Application Reference Number: 6.4.5) of the Environmental Statement. The cumulative effects of road traffic and the construction plant emissions are provided in chapter I4 (intra-project cumulative effects) (Application Reference Number: 6.9.4) of the Environmental Statement.

2.3.2 The IACC also undertook measurements of baseline dust deposition rates at several locations in the vicinity of the Wylfa Newydd Development Area 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 dust deposition rate that could possibly

affect amenity. Suggested guidelines for the dust deposition rate for when complaints are likely 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). 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].

2.4 Local climatic and soil conditions

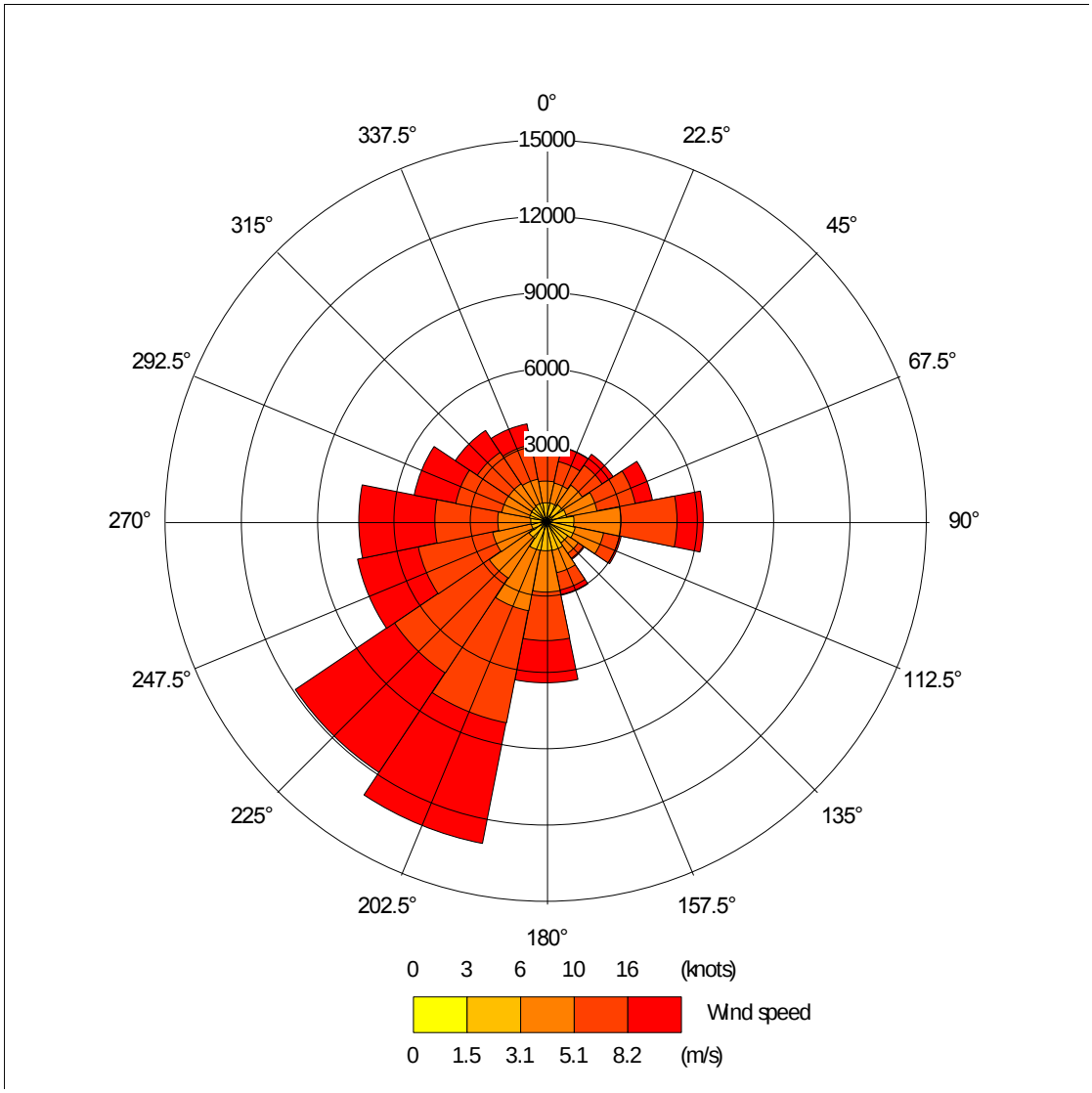
2.4.1 Although not specifically required as part of the IAQM dust assessment method, analysis of the local climatic conditions was also undertaken to provide additional context to the risk assessment and to assist in the determination of the sensitivity of the area.

2.4.2 Local climatic conditions such as wind speed and precipitation (rainfall) will affect the probability of airborne dust occurring from potentially dusty activities or 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.

2.4.3 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. 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 Wylfa Newydd Development Area and which could potentially be affected by fugitive dust emissions.

2.4.4 A wind rose for the NWP data has been provided in figure 2-1 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 2-1 Wind rose – Wylfa Newydd Development Area NWP 2007–2016



2.4.5 Table 2-1 tabulates the wind speed and direction 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 2-2 tabulates the wind speed and direction for dry periods (i.e. days with less than 1mm precipitation).

Table 2-1 Wylfa Newydd Development Area NWP data wind analysis (01 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 – 0.0	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 2-2 Wylfa Newydd Development Area NWP data wind analysis during dry days (daily rainfall less than 1mm) (01 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%

2.4.6 Table 2-1 presents the frequency of winds as a percentage of all winds at the Wylfa Newydd Development Area between 2007 and 2016 for each 22.5° wind direction sector within specified wind-speed bands. Table 2-1 and figure 2-1 illustrate that the most frequently occurring wind direction is from a south-southwest direction 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 which generated dust emissions would have the highest probability of experiencing potential increases in dust deposition or PM_{10} concentrations. The next most frequently occurring wind directions are south, west-southwest and west, which are approximately 7% to 8% of the time each. On this basis, receptors which are located to the east and through to the northeast and north would be most susceptible to construction dust impacts if activities within the Wylfa Newydd Development Area generate dust emissions.

2.4.7 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 2-1 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.

2.4.8 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 would 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 2-2 shows that the percentage of time when the wind was above 5.0m/s and the conditions were dry is much lower, at 30% of the time.

2.4.9 Table 2-3 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 2-3 Wylfa Newydd Power Station NWP precipitation data analysis (01 January 2007 – 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%

2.4.10 Within the Wylfa Newydd Development Area, the National Soil Resources Institute soils report [RD9] identifies the predominant soil type as having a low permeability and water storage capacity. The soil type which is present within the southeastern and southwestern extents of the Wylfa Newydd Development Area is identified as being slowly permeable with negligible storage capacity [RD10]. The Agricultural Land Classification surveys which have been undertaken across the Wylfa Newydd Development Area [RD10] [RD11], indicate that the topsoil is well drained within the northeast and southwest of the Wylfa Newydd Development Area but frequently waterlogged across much of the rest of the site. The local climatic conditions also suggest that the soil would be saturated for much of the year [RD11]. This would potentially reduce the friability of the materials and the potential dust generation from soils during excavation, loading into earth-moving equipment (such as dump trucks), transport around the site and storage or placement in the landscape mounds. It would also reduce the potential for dust being emitted from wind erosion as discussed above. In addition, Defra guidance [RD12] states that wind erosion is most likely on fine sandy soils with particle sizes of 0.1mm to 0.2mm diameter and light peaty soils with particles of about 1mm diameter. Six soil samples were obtained during the Agricultural Land Classification [RD11] and scheduled for particle size analysis, five of which were classed as medium clay loams, with the other classed as a sandy clay loam. The average particle size classes were:

- 41% sand (0.063mm to 2 mm);
- 36% silt (0.002mm to 0.063 mm); and
- 23% clay (less than 0.002 mm).

2.4.11 These textures and particle size distributions indicate that the soils would not be particularly susceptible to wind erosion, since the level of clay present would be sufficient to largely buffer the soils against wind erosion by binding the soil particles together, especially when the soil is wet. The soil would be more susceptible to wind erosion when it is first reinstated or being disturbed, especially if allowed to dry out. Further details of the soils within the Wylfa

Newydd Development Area are provided in chapter D7 (soils and geology) (Application Reference Number: 6.4.7) and its associated appendices.

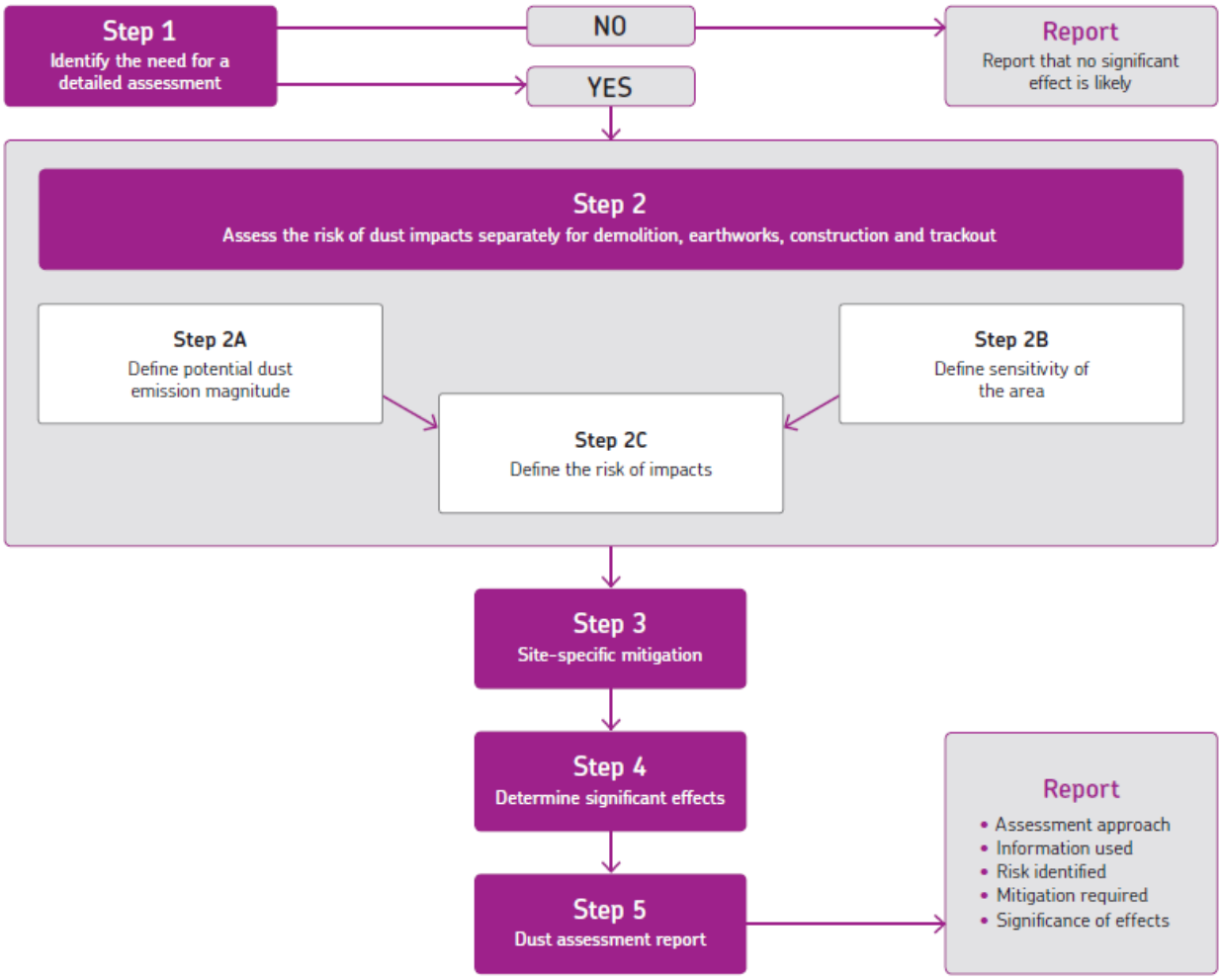
2.4.12 Considering the above wind and rain analysis, the likelihood that the conditions which could lead to dust being emitted due to wind erosion when the wind speed is high enough (i.e. 5.0m/s or higher), and then transported in the air to nearby receptors are likely to be relatively low. For example, 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 2-2). In practice, wind erosion is also less likely to occur given the relatively high moisture content of the soils within the Wylfa Newydd Development Area.

2.5 IAQM assessment methodology

Outline of method

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

Figure 2-2 Structure of construction dust assessment



Step 1 Identify the need for a detailed assessment

2.5.2 An assessment will be required where there is:

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

2.5.3 The requirement for a dust risk assessment can be screened out where the criteria above are not met, 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 2-2.

Step 2 Assess the risk of dust impacts

Step 2A Define the potential dust emission magnitude

Demolition

2.5.4 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

2.5.5 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), 5 to10 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), fewer 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

2.5.6 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

2.5.7 Trackout refers to the transport of dust and dirt from the Wylfa Newydd Development Area 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 proposed Wylfa Newydd Development Area site entrance are considered to be at risk.

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

Large: greater than 50 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

2.5.9 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.

2.5.10 For this assessment of the sensitivities of people to dust soiling effects and to the health effects of PM_{10}, the receptors will be 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 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 AQO 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 AQO 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 would 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

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

High:

- locations with an international or national designation and the designated features may be affected by dust soiling; or
- locations where there is a community of a particularly dust-sensitive species such as vascular species included in the Red Data List for Great Britain [RD13].

Indicative examples include an SAC 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 an SSSI 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.

2.5.12 Table 2-4 and table 2-5 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 2-6 sets out the selection criteria for the sensitivity of the area with regard to impacts on ecological receptors.

Table 2-4 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 2-5 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 2-6 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

2.5.13 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 2-7 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 2-7 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 risk
Earthworks			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible risk
Construction			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Medium risk	Low risk
Low	Low risk	Low risk	Negligible risk
Trackout			
High	High risk	Medium risk	Low risk
Medium	Medium risk	Low risk	Negligible risk
Low	Low risk	Low risk	Negligible risk

Step 3 Site-specific mitigation

2.5.14 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 the risk category for the demolition, earthworks, construction and trackout activities based on table 2-7, appropriate mitigation measures can be identified. Activities identified as a High risk would require a greater level of mitigation than those identified as Low risk.

2.5.15 A selection of these measures has been specified for low risk to high risk sites in the IAQM guidance [RD1] as measures suitable to mitigate dust emissions from activities such as those which would be undertaken during Main Construction.

Step 4 Determine significant effects

2.5.16 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.

2.5.17 The approach in Step 4 of IAQM dust assessment guidance 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."

2.5.18 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."

2.5.19 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 ongoing 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.

3 Step 1 Identify the need for a detailed assessment

3.1 Human receptors

3.1.1 An assessment of potential demolition and construction impacts was undertaken in accordance with the IAQM methodology as described earlier and as set out in section 2. 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 Wylfa Newydd Development Area.

3.1.2 There are human receptors within the boundary and within 350m of the Wylfa Newydd Development Area; therefore, further assessment is required. The receptors are located within Tregele, Cemaes and as isolated properties along the A5025 and within the surrounding area. 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 3-1. The receptors have been identified as being of High, Medium or Low sensitivity based on the criteria set out in paragraph 2.5.10. A figure of the relevant receptors within the assessment bands for dust soiling from the boundary of the Wylfa Newydd Development Area is provided in figure 8-1 (see section 8 of this report).

3.1.3 As per IAQM guidance [RD1], the 545 High sensitivity receptors presented in table 3-1 for demolition, earthworks and construction includes the approximate number of pupils and staff expected to attend Cemaes Primary School (Ysgol Gynradd Cemaes) (up to 60 pupils and staff).

3.1.4 There are 5 Public Rights of Way (inclusive of those that form part of the Wales Coast Path) within the Wylfa Newydd Development Area. These have been included in the receptor count as a Low sensitivity as per the criteria set out in paragraph 2.5.10. These Public Rights of Way are presented in figure D4-5 in chapter D4 (public access and recreation) (Application Reference Number: 6.4.4).

3.1.5 During Main Construction, up to 4,000 workers will reside in the Site Campus within the Wylfa Newydd Development Area. It should be noted these worker numbers are not specifically included within the receptor count in table 3-1. Their sensitivity to potential dust soiling and health effects is considered to be lower than members of the public living close to or within the Wylfa Newydd Development Area (i.e. medium receptor sensitivity) (as per the IAQM guidance [RD1] for workers, which are generally less sensitive to air pollution than the public). The location of the Site Campus is presented in figure 8-1. The inclusion of the 4,000 medium sensitivity workers does not alter the risk levels determined at stage 2C of the assessment process.

3.1.6 During Main Construction, site access will initially be via the existing Power Station access road before utilising the new Power Station access road (to the south of Tregele) upon its completion. For completeness, both site entrances have been included to assess trackout. The assessment has demonstrated that there are human receptors (e.g. residential properties) within 50m of the road network up to 500m from the Wylfa Newydd Development Area site

entrances, which would be utilised during Main Construction. These receptors are set out in table 3-1 and are displayed in figure 8-1.

Table 3-1 Dust soiling and human health receptor count

Receptor count				
Demolition, earthworks and construction		Receptor sensitivity		
		High	Medium	Low
Distance from Wylfa Newydd Development Area boundary	<20m	16	2	5
	<50m	63	4	7
	<100m	139	4	9
	<350m	545	22	16
Trackout		High	Medium	Low
Distance from roads up to 500m from the proposed Wylfa Newydd Development Area site exit	<20m	4	0	2
	20m–50m	27	3	0

3.2 Ecological receptors

3.2.1 The effects of construction dust on ecological sites have also been considered. Dust can have direct physical effects including reduced photosynthesis, respiration and transpiration through coating and smothering. The smothering has been found to affect photosynthesis both by shading and also by obstructing diffusion through blocking of the leaf stomata [RD8]. Other direct effects include altering the pH of the soils or surface water in the ecological site through deposition of dusts with high acidity or alkalinity. This could lead to the loss of certain plants which prefer a specific soil or water chemistry.

3.2.2 Indirect effects of the dust soiling and smothering can include increased susceptibility of the plant to other stresses, including air pollution or pathogens.

3.2.3 Non-vascular species such as mosses and lichens are considered to be the most sensitive species to dust soiling and smothering as they absorb water and nutrients directly from the air. As these lack a protective cuticle, dust deposited onto their surfaces can act as a desiccant, drying out and damaging their tissues [RD14].

3.2.4 The ecological sites considered in this assessment are displayed in table 3-2 and shown in figure 8-1 (see section 8 of this report). The ecological sites were categorised into a dust deposition sensitivity class of Low, Medium or High by the ecologists undertaking the assessments for the Wylfa Newydd Project. This took into account the value of the sites ecological assets as recommended in the IAQM construction dust guidance [RD1] and the likely sensitivity to dust soiling and smothering of the vegetation within each site.

3.2.5 There were no ecological sites within 50m of the road network up to 500m from the Wylfa Newydd Development Area site entrances, and therefore trackout was not required to be considered further in the assessment.

Table 3-2 Ecological receptor identification and sensitivity

Ecological receptor	Distance from the Wylfa Newydd Development Area (m)	Sensitivity to dust deposition	Reason for sensitivity classification
Demolition, earthworks and construction			
Sites within 50m study area			
Tre'r Gof SSSI	0m (within the Wylfa Newydd Development Area)	High	A hydrologically dependant alkaline basin mire/fen habitat with a wide range of wetland plant species, including blunt-flowered rush (*Juncus subnodulosus*) and the scarce marsh fern (*Thelypteris thelypteroides*). Fen sedge (*Cladium mariscus*) and black bog rush (*Schoenus nigricans*) are also present and are listed in the Red Data List for Great Britain [RD13], albeit both species are listed as Least Concern.
Ancient Woodland	0m (there are two areas of ancient semi-natural woodland and one restored ancient woodland site within the Wylfa Newydd Development Area).	Low	One area of ancient semi-natural woodland comprising mixed plantation woodland, one ancient semi-natural woodland comprising broadleaved woodland and broadleaved parkland, and one area of restored ancient woodland site comprising mixed plantation woodland.

Ecological receptor	Distance from the Wylfa Newydd Development Area (m)	Sensitivity to dust deposition	Reason for sensitivity classification
Arfordir Mynydd y Wylfa - Trwyn Penrhyn (Wylfa Head) Wildlife Site	0m (within the Wylfa Newydd Development Area)	Low	A mixture of coastal grassland with some areas of heather (*Calluna vulgaris*). The wildlife site is notable for choughs which breed on the cliffs, a colony of gulls, including black headed gulls (*Chroicocephalus ridibundus*) and herring gulls (*Larus argentatus*), which nest near Porth Wnal.
Morwenoliaid Ynys Môn/Anglesey Terns SPA	0m (adjacent to the Wylfa Newydd Development Area at the closest point and includes the whole north Anglesey coast)	Not sensitive	The marine section of the SPA is along the northern coast adjacent to the Wylfa Newydd Development Area and is below the mean high water line. The marine section of the SPA is therefore not sensitive to dust deposition. The Cemlyn Bay section of the Anglesey Terns SPA, which contains terrestrial habitats, is contained within the Cemlyn Bay SSSI and SAC boundary. This is discussed below.
Cae Gwyn SSSI	0m (adjacent to the Wylfa Newydd Development Area at the closest point)	High	Two wetland areas separated by an area of heathland. Wetland areas contain bogmoss (*Sphagnum spp*.), common wetland herbs and royal fern (*Osmunda regalis*). Other notable species are cranberry (*Vaccinium oxycoccos*) and mud sedge (*Carex limosa*). Royal fern and mud sedge are both plants that are listed in the Red Data List for Great Britain [RD13], albeit both species are listed as Least Concern.

Ecological receptor	Distance from the Wylfa Newydd Development Area (m)	Sensitivity to dust deposition	Reason for sensitivity classification
Trwyn Pencarreg Wildlife Site	40m to the southwest of the Wylfa Newydd Development Area at its nearest point.	Low	Coastal and semi-improved grassland adjacent to Porth-y-pistyll and Cemlyn Bay.
Sites outside the 50m study area			
Gogledd Môn Forol/North Anglesey Marine candidate SAC	Approximately 50m north of the Wylfa Newydd Development Area at the closest point but includes the whole north Anglesey coast	Not sensitive	The candidate SAC is along the northern coast adjacent to the Wylfa Newydd Development Area and is below the mean high water line. The candidate SAC is therefore not sensitive to dust deposition.
Cemlyn Bay SAC and SSSI	110m to the west of the Wylfa Newydd Development Area at its nearest point.	High	Vegetation of shingle bank communities (Crambe maritima, Raphanus maritimus, Ranunculus baudotii and Ruppia maritima).
Anglesey Terns / Morwenoliaid Ynys Môn SPA (the Cemlyn Bay section of the SPA which contains some terrestrial habitats)	110m to the west of the Wylfa Newydd Development Area at its nearest point.	Low	Nesting terns in Cemlyn Lagoon area. The nesting sites are unlikely to be particularly sensitive to dust deposition.

Ecological receptor	Distance from the Wylfa Newydd Development Area (m)	Sensitivity to dust deposition	Reason for sensitivity classification
Trackout			
The Cae Gwyn SSSI is the nearest ecological site to the road network within 500m of the new Power Station access road site entrance/exit (a distance of approximately 205m from the A5025 carriageway). Trackout is therefore scoped out and considered as Negligible risk.			

3.2.6 Table 3-2 shows that there are several designated ecological sites within or in close proximity to the Wylfa Newydd Development Area, including Tre'r Gof SSSI, Cae Gwyn SSSI, Ancient Woodland, Arfordir Mynydd y Wylfa – Trwyn Penrhyn (Wylfa Head) Wildlife Site and Trwyn Pencarreg Wildlife Site. These sites have therefore been assessed for the potential impacts of dust emissions due to potential earthworks and construction activities associated with Main Construction.

Tre'r Gof SSSI

3.2.7 Located within the Wylfa Newydd Development Area, the Tre'r Gof SSSI is a rich-fen habitat which includes associated communities comprising fen sedge (*Cladium mariscus*), blunt-flowered rush (*Juncus subnodulosus*) black bog rush (*Schoenus nigricans*) and common reed (*Phragmites communis*). Due to their physical structure and relatively low horizontal surface area of foliage, it is unlikely that these types of vegetation would be highly sensitive to dust soiling or smothering.

3.2.8 A population of scarce marsh fern (*Thelypteris thelypteroides*) is present at Tre'r Gof SSSI. This plant species may be more susceptible to dust soiling as it has a higher foliage surface area, which has the potential to trap deposited dust which may not be removed by rainfall.

3.2.9 As a precautionary approach, Tre'r Gof SSSI has been classed as a High sensitivity receptor in accordance with the IAQM guidance [RD1].

Ancient Woodland

3.2.10 During Main Construction, the Ancient Woodland habitat at Simdda-Wen (ID 26059) and the Firs Hotel (ID 26075) would be lost via tree felling, vegetation clearance and topsoil clearance to facilitate construction of the Power Station. The parcel of ancient semi-natural woodland (ID 26060) located in the northern sector of the Wylfa Newydd Development Area would be retained, although track improvement works through the Ancient Woodland are anticipated to allow vehicles to transport material from the rock-winning area. These track improvement works would include the widening of the existing track by a maximum of 500mm on either side, widening the access gateway and raising the crown height of a small number of trees. The parcel of Ancient Woodland has been classed as a Low sensitivity receptor as per IAQM guidance [RD1].

Cae Gwyn SSSI

3.2.11 Cae Gwyn SSSI is located adjacent to the southern boundary of the Wylfa Newydd Development Area and comprises two wetland areas separated by an area of heathland with outcropping rock. The southern wetland comprises a 'lawn' of bogmoss (*Sphagnum* spp.), which is considered to be highly sensitive to air pollutants [RD10]. During Main Construction earthworks, Cae Gwyn SSSI would be in close proximity to activities associated with the formation of a landscape mound (Mound C) adjacent to the new site entrance. Cae Gwyn SSSI has been classed as a High sensitivity receptor in accordance with the IAQM guidance [RD1] due to the presence of the bogmoss.

Morwenoliaid Ynys Môn/Anglesey Terns SPA and Gogledd Môn Forol/North Anglesey Marine candidate SAC

3.2.12 The Morwenoliaid Ynys Môn/Anglesey Terns SPA, located adjacent to the Wylfa Newydd Development Area, and Gogledd Môn Forol/North Anglesey Marine candidate SAC, located approximately 50m from the Wylfa Newydd Development Area, are designated for the marine species they support. It is unlikely that the North Anglesey Marine candidate SAC (proposed for harbour porpoise) is particularly sensitive to dust deposition, as the candidate SAC is a marine area within which the habitats are predominantly subtidal (i.e. below the mean low water mark). With regard to the Anglesey Terns SPA, the area is designated to protect the marine area used by foraging terns. The habitats within the SPA are also primarily subtidal or intertidal (i.e. below the mean high water mark) and, therefore, not sensitive to dust deposition. On the above basis, these areas have not been specifically assessed as part of the assessment, as the features of the candidate SAC and extended SPA are not sensitive to dust deposition and any effects would be not significant.

Arfordir Mynydd y Wylfa - Trwyn Penrhyn Wildlife Site

3.2.13 Arfordir Mynydd y Wylfa - Trwyn Penrhyn Wildlife Site is situated within the Wylfa Newydd Development Area and comprises a mixture of coastal grassland with some areas of heather (*Calluna vulgaris*). The Wildlife Site has been classed as a Low sensitivity receptor in accordance with the IAQM guidance.

3.2.14 Parts of the construction of the outfall structures of the Cooling Water System would take place within the Arfordir Mynydd y Wylfa - Trwyn Penrhyn Wildlife Site at Wylfa Head. In addition, the construction of the Site Campus would also take place in close proximity to the southern boundary of the Wildlife Site.

Trwyn Pencarreg Wildlife Site

3.2.15 Trwyn Pencarreg Wildlife Site is located 40m to the southwest of the Wylfa Newydd Development Area at its nearest point. Trwyn Pencarreg Wildlife Site comprises coastal heath grading to inland heath with areas of coastal and marshy grassland. During Main Construction, Trwyn Pencarreg Wildlife Site would be in close proximity to activities associated with the construction of the west breakwater, site levelling/grading and development of the building platforms and approximately 300m to 400m from the deep excavations to the

east and approximately 400m from the nearest landscape mounding to the south. Trwyn Pencarreg Wildlife Site has been classed as a Low sensitivity receptor in accordance with the IAQM guidance [RD1].

Cemlyn Bay SAC and SSSI

3.2.16 Cemlyn Bay SAC and SSSI is located approximately 110m to the north of the Wylfa Newydd Development Area at its closest point. It comprises vegetation of shingle bank communities and saltmarsh and provides a habitat for colonies of common, arctic and sandwich terns which breed on low islands in the main lagoon. During Main Construction, earthworks activities in closest proximity to the ecological site include the formation of the landscape mounding (Mound E) on the western section of the Wylfa Newydd Development Area. The landscape mound would be approximately 130m to the southwest of the nearest section of Cemlyn Bay SAC and SSSI.

3.2.17 It is unlikely that these types of vegetation, which are found in coastal areas, would be highly sensitive to dust soiling or smothering. However, as a precautionary approach, the ecological site has been classed as a High sensitivity receptor in accordance with the IAQM guidance [RD1].

3.2.18 It should be noted that the IAQM guidance recommends that an ecological site does not need to be considered further if it is greater than 50m from the construction dust source. Although the Cemlyn Bay SAC and SSSI is over 100m from the Wylfa Newydd Development Area, given its status, the potential for significant residual effects of dust arising from activities undertaken on the Wylfa Newydd Development Area has been considered further in section 6 (Step 4 of the dust assessment).

Cestyll Garden (Registered Historic Park and Garden Grade II)

3.2.19 In addition to those ecological receptors presented in table 3-2, Cestyll Garden (Registered Historic Park and Garden Grade II) is adjacent to the Wylfa Newydd Development Area and has been identified as having vegetation that may be sensitive to dust deposition. Although not assessed specifically in this dust assessment, as its designation relates to its cultural heritage value rather than its ecological value, the application of mitigation measures applied to reduce the risks of dust effects at the assessed ecological receptors within or adjacent to the Wylfa Newydd Development Area (i.e. the Tre'r Gof SSSI and Cae Gwyn SSSI) would also reduce the risk of dust effects at Cestyll Garden. The assessment of air quality effects at Cestyll Gardens is contained in chapter D11 (cultural heritage) (Application Reference Number: 6.4.11) of the Environmental Statement.

4 Step 2 Assess the risk of dust impacts

4.1 Step 2A Define the potential dust emission magnitude

4.1.1 The Main Construction works would be split into several stages, which could potentially involve different periods of demolition, earthworks, construction and trackout, and activity levels of which would not necessarily peak simultaneously.

4.1.2 The dust emission magnitudes of each activity have been specified using the definitions of dust emission magnitudes in section 2.5 and using professional judgement in line with IAQM guidance [RD1]. These are summarised below.

Demolition: The boundary of the Wylfa Newydd Development Area encompasses both existing developed land and undeveloped agricultural land. Demolition of the majority of buildings and structures would be undertaken during the SPC works. However, as discussed previously, the full scope of SPC works is included in this assessment. Therefore, demolition activities would involve the demolition of 35 existing buildings and structures, including over 20km of stone wall, dry wall and retaining wall within the Wylfa Newydd Development Area. The volume of demolition material associated with these works would be between 20,000m^3 and 50,000m^3. Demolition activities are unlikely to be required at heights exceeding 10m. Although not directly categorised as a demolition activity, rock excavation by blasting techniques (to facilitate the construction of the platforms and provide concrete foundations for support buildings) is required. There would be on-site crushing activities. The demolition material may be dusty. As per IAQM guidance [RD1], the requirement for on-site crushing equipment means it may be considered appropriate to increase the dust emission magnitude by one class. However, the limited demolition activities required means the assessment for demolition is based on a dust emission class of 'Medium'. Demolition of the Site Campus during Main Construction is not considered in this category as the removal of the Site Campus structures would not comprise typical demolition activities which could cause dust emissions. The main activities would be the dismantling and removal of the pre-fabricated modular units). Earthworks related to the removal of the structures and subsequent landscaping would be captured by the assessment of earthworks below.

Earthworks: Prior to Main Construction, earthworks associated with the remediation activities include excavation of the asbestos-contaminated soils, and handling/processing of the

asbestos-contaminated soils at the remediation compound. Earthwork activities associated with Main Construction include topsoil stripping site establishment, mound formation, levelling and deep excavations to form working platforms for construction of the main foundations of the Power Station. The site area of the Wylfa Newydd Development Area is approximately 4,000,000m^2. The volume of topsoil stripping, excavation and placement of the deeper soil and rock material, including dredging and excavation for the Marine Works, is well in excess of the higher threshold of 100,000 tonnes total material moved for identifying a Large dust emission magnitude set out in the IAQM guidance [RD1]. The total material moved is anticipated to be in excess of 10,000,000 tonnes. The earthworks and landscaping would require the formation of bunds and mounds which are considerably higher than 8m above ground level. The soil profile of the Wylfa Newydd Development Area comprises mainly medium clay loam which may be prone to suspension when dry, and there would be considerably more than 10 heavy earth-moving machines active at any one time. On this basis, the proposed earthworks have been classified as a dust emission class of 'Large'.

Construction: The proposed SPC works include the construction of the main site compound and 10 satellite compounds. During Main Construction, there is a significant amount of construction required for the full development of the Power Station, including the reactor buildings, control building, radioactive waste buildings, Cooling Water System and supporting facilities, including the MOLF and Site Campus, which is anticipated to accommodate up to 4,000 construction workers. The total building volume during Main Construction is several million cubic metres (well above the higher threshold of 100,000m^3 total building volume for identifying a Large dust emission magnitude set out in the IAQM guidance [RD1]. Furthermore, the Main Construction would utilise potentially dusty construction materials such as concrete, and it is anticipated the on-site concrete batching plant (see section 5.2) may be operational during periods of Main Construction on a near-continuous basis. On this basis, the assessment for construction is based on a dust emission class of 'Large'.

Trackout: During Main Construction, the maximum number of daily outward movements of HDVs is anticipated to be approximately 160 in any one day (excluding buses). This includes the number of daily outward movements associated with construction activities for site mobilisation

and access, the Power Blocks and Ancillary Structures, the MOLF and consumables and waste. Therefore, on this basis, the assessment for trackout is based on a dust emission class of 'Large'.

4.1.3 Table 4-1 presents as a summary of the dust emission magnitude for each activity based on the criteria set out in section 2.5.

Table 4-1 Dust emission magnitude

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

4.2 Step 2B Define the sensitivity of the area

4.2.1 The Wylfa Newydd Development Area is surrounded by residential receptors to the west, east and south; in some directions, there are receptors within or adjacent to the boundary of the Wylfa Newydd Development Area. If the works associated with Main Construction were to produce excessive dust emissions, it is possible that significant effects may be experienced at sensitive receptors if suitable mitigation measures are not employed. The hourly sequential meteorological data, as described in section 2.4, show that the predominant wind direction is from the south-southwest. This means that, on average, receptors to the east and north-northeast of the Wylfa Newydd Development Area, including the nearest properties in Tregele and Cemaes, would be most susceptible to any potential fugitive dust emissions.

4.2.2 Table 4-2 displays the sensitivities of the surrounding area to demolition, earthworks, construction and trackout based on the criteria set out in table 2-4 and table 2-5, numbers of receptors within certain distance bands of the Wylfa Newydd Development Area (see table 3-1) 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 Wylfa Newydd Development Area. 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 4-2 Sensitivity of the area for human receptors

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

4.2.3 Table 4-2 shows that, based on the receptor sensitivity of High, the background PM_{10} concentration and the number of receptors within proximity of the Wylfa Newydd Development Area, for dust soiling impacts the sensitivity of the area is categorised as High for demolition, earthworks and construction and Medium for trackout. For human health impacts as assessed using the IAQM guidance [RD1], the sensitivity of the area is categorised as Low for demolition, earthworks, construction and trackout activities.

4.2.4 Table 4-3 displays the sensitivities of the surrounding ecological sites to demolition, earthworks and construction activities based on the proximity of relevant sites and the value of the sites' ecological assets as advised by the project ecologists and in line with the IAQM guidance.

Table 4-3 Sensitivity of the area for ecological receptors

Habitat site	Sensitivity of the surrounding area			
	Demolition	Earthworks	Construction	Trackout
Tre'r Gof SSSI	High	High	High	N/A
Cae Gwyn SSSI	High	High	High	
Ancient Woodland	Low	Low	Low	
Arfordir Mynydd y Wylfa - Trwyn Penrhyn Wildlife Site	Low	Low	Low	
Trwyn Pencarreg Wildlife Site	Low	Low	Low	
Overall sensitivity	High	High	High	

4.2.5 Table 4-3 shows that, based on the proximity of relevant ecological sites and the value of the sites' ecological assets, the Tre'r Gof SSSI and Cae Gwyn SSSI has been classed as being of High sensitivity for demolition, earthworks and construction activities. The Ancient Woodland (ID 26060), Arfordir Mynydd y Wylfa - Trwyn Penrhyn Wildlife Site and Trwyn Pencarreg Wildlife Site have been classed as Low sensitivity.

4.2.6 The sensitivity of the ecological sites for trackout is categorised as "N/A" as there are no ecological sites in close proximity to the local road network.

4.2.7 Overall, the sensitivity of the area for ecological receptors is categorised as High for demolition, earthworks and construction activities.

4.3 Step 2C Define the risk of impacts

4.3.1 Using the dust emission magnitudes for the various activities in table 4-1 and the sensitivity of the area provided in table 4-2, the definition of the risks for each activity are provided in table 4-4 for dust soiling and human health impacts and table 4-5 for impacts on ecological sites.

Table 4-4 Summary of the dust risks for human receptors

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

4.3.2 The results in table 4-4 indicate that, for potential dust soiling impacts, there is predicted to be a High risk from earthworks and construction and Medium risk from demolition and trackout activities. For potential human health impacts as determined using the IAQM assessment methodology [RD1], there is predicted to be a Low risk for all stages of the development.

Table 4-5 Summary of the dust risks for ecological sites

Ecological site	Risk			
	Demolition	Earthworks	Construction	Trackout
Tre'r Gof SSSI	Medium risk	High risk	High risk	Negligible risk
Cae Gwyn SSSI	Medium risk	High risk	High risk	Negligible risk
Ancient Woodland	Low risk	Low risk	Low risk	Negligible risk
Arfordir Mynydd y Wylfa - Trwyn Penrhyn Wildlife Site	Low risk	Low risk	Low risk	Negligible risk
Trwyn Pencarreg Wildlife Site	Low risk	Low risk	Low risk	Negligible risk
Overall risk	Medium risk	High risk	High risk	Negligible risk

4.3.3 The results in table 4-5 indicate that at Tre'r Gof SSSI and Cae Gwyn SSSI, there is a High risk predicted for the potential impacts from earthworks and construction activities, a Medium risk from demolition activities and a Negligible risk from trackout activities. For the assessed Ancient Woodland,

Arfordir Mynydd y Wylfa - Trwyn Penrhyn Wildlife Site and Trwyn Pencarreg Wildlife Site, the risks from demolition, earthworks and construction are categorised as a Low risk, and a Negligible risk is specified for trackout activities.

4.3.4 The overall risk to ecological sites is categorised as High risk from earthworks and construction activities and a Medium risk from demolition activities.

4.4 Summary

4.4.1 The results in table 4-4 indicate that there would be a High risk to sensitive human receptors with regard to dust soiling effects from earthworks and construction and Medium risk from demolition and trackout activities. It will therefore be necessary to adopt an appropriate level of good practice mitigation measures to reduce these risks. This would also prevent or reduce potential dust or PM_{10} (and $PM_{2.5}$) emissions associated with health effects, such as exacerbating existing conditions including asthma and other lung conditions.

4.4.2 It should be noted the Low risk regarding human health effects from activities associated with Main Construction is largely based on the relatively low existing concentrations of PM_{10} (and $PM_{2.5}$) in the vicinity of the Wylfa Newydd Development Area and that these are well below the relevant AQOs.

4.4.3 For ecological receptors, the results in table 4-5 indicate that there would potentially be a High risk to the Tre'r Gof SSSI and Cae Gwyn SSSI with regard to dust soiling effects from earthworks and construction activities. It will therefore be necessary to put mitigation measures in place to reduce the potential impacts due to these activities. The mitigation measures would also contribute to reducing the potential effects at the parcel of Ancient Woodland and Arfordir Mynydd y Wylfa - Trwyn Penrhyn Wildlife Site within the boundary of the Wylfa Newydd Development Area and Trwyn Pencarreg Wildlife Site, where a Low or Negligible risk was identified, and all other nearby ecological receptors discussed within this report.

4.4.4 The proposed mitigation measures are set out in section 5.

5 Step 3 Site-specific mitigation

5.1 Recommended mitigation measures

5.1.1 The results in section 4 indicate that the activities associated with Main Construction are a High risk for dust soiling effects at sensitive human receptors and sensitive ecological receptors (i.e. Tre'r Gof SSSI and Cae Gwyn SSSI) from earthworks and construction activities. Good practice mitigation measures would be needed to reduce the potential for significant dust effects in the vicinity of the Wylfa Newydd Development Area. The suggested good practice mitigation measures which should be adopted for the works associated with Main Construction are set out below.

5.1.2 The mitigation measures have been derived from those specified in the IAQM guidance and, where possible at this stage, adapted to the activities associated with Main Construction [RD1]. Measures such as those specified in this section 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 5-1 to table 5-6 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 the 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 5-2) of the general mitigation measures required for all sites. The general mitigation measures for all sites were specified based on the highest risk category (i.e. based on the High risk to human and ecological receptors from dust soiling) as recommended by the IAQM guidance [RD1].

5.1.3 As specified above, the measures to control dust emissions taken forward from this assessment, derived from the highly recommended or desirable measures (see table 5-1 to table 5-6), would be included in the air quality management strategy set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Power Station Main Site sub-CoCP (Application Reference Number: 8.7) for construction of the Power Station. These would be delivered during construction.

5.1.4 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."

5.1.5 The mitigation measures set out below 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, via mitigation measure number four.

5.1.6 In addition to the mitigation measures set out below, other good practice mitigation would include management of amenity effects due to potential dust soiling at the Site Campus. Dust deposition would be controlled by appropriate cleaning and maintenance of the Site Campus as required. It should be noted the mitigation measures set out below are applicable to both the construction and removal of the Site Campus during Main Construction.

5.1.7 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 [RD15] for mobile crushing and screening, where relevant.

Table 5-1 Mitigation for the Wylfa Newydd Development Area: 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 Wylfa Newydd Development Area.	Highly recommended
2. Display the name and contact details of person(s) accountable for air quality and dust issues on the Wylfa Newydd Development Area 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

Table 5-2 Mitigation for the Wylfa Newydd Development Area: dust management

Mitigation measure	Highly recommended / Desirable / Not required
4. Develop dust mitigation and control measures as part of the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Power Station Main Site sub-CoCP (Application Reference Number: 8.7) 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 Power Station Main Site sub-CoCP (Application Reference Number: 8.7). 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 Wylfa Newydd Development Area.	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 potentially high-risk construction sites within 500m of the Wylfa Newydd Development Area boundary (e.g. decommissioning of the Existing Power Station) and ensure plans are co-ordinated with any other works within the Wylfa Newydd Development Area (e.g. National Grid electricity grid connection).	Highly recommended

Mitigation measure	Highly recommended / Desirable / Not required
Monitoring	
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 Wylfa Newydd Development Area boundary, with cleaning to be provided if necessary.	Highly recommended
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 [RD16] on monitoring during demolition, earthworks and construction (see section 7.3).	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

Mitigation measure	Highly recommended / Desirable / Not required
14. Erect solid screens or barriers around dusty activities, or the Wylfa Newydd Development Area boundary, which are at least as high as any stockpiles on-site.	Highly recommended: Given the size of the Wylfa Newydd Development Area and activities, this is unlikely to be practical. Other appropriate measures may be considered to reduce the risk of dust emissions from dusty activities and stockpiles such as dust suppression techniques, including water spraying or stabilisation via seeding of stockpiles / mounding with grass.
15. Where practicable, fully enclose site or specific operations where there is a high potential for dust production and the Wylfa Newydd Development Area is active for an extensive period.	Highly recommended
16. Avoid site runoff of water or mud.	Highly recommended
17. Keep the security fencing around the construction site, barriers and scaffolding clean using wet methods.	Highly recommended
18. Remove materials that have a potential to produce dust from the Wylfa Newydd Development Area 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

Mitigation measure	Highly recommended / Desirable / Not required
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).	Highly recommended
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 Power Station will be covered within the traffic and transport management strategy as set out in the wider Wylfa Newydd CoCP (Application Reference Number: 8.6).
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car sharing).	Highly recommended: As part of the DCO application, the measures to manage/mitigate the effects of constructing the Power Station will be covered within the traffic and transport management strategy as set out in the wider Wylfa Newydd CoCP (Application Reference Number: 8.6).
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

Mitigation measure	Highly recommended / Desirable / Not required
27. Ensure an adequate water supply on the Wylfa Newydd Development Area 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
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. Avoid bonfires and burning of waste materials.	Highly recommended

Table 5-3 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 spays 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 for demolition activities, using appropriate manual or mechanical alternatives.	Not practicable: As discussed in section 5, rock excavation by blasting techniques is required during Main Construction. All explosive blasting works would be undertaken by a specialist blasting contractor.
35. Bag and remove any biological debris or damp down such material before demolition.	Highly recommended

Table 5-4 Mitigation measures specific to earthworks

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

Table 5-5 Mitigation measures specific to construction

Mitigation measure	Highly recommended / Desirable / Not required
39. Avoid scabbling (roughening of concrete surfaces) if possible.	Highly recommended
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.	Highly recommended
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.	Highly recommended
42. For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.	Highly recommended

Table 5-6 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 permits.	Highly recommended
51. Access gates to be located at least 10m from receptors where possible.	Not required: This would not be required as there are no receptors within 10m of the proposed entrance

5.2 Concrete Batching Plant

5.2.1 As discussed in section 4.1, an on-site concrete batching plant would be required during Main Construction of the Power Station to prepare concrete for the construction of the site-wide infrastructure and buildings. The batching plant would be located at the north of the site to allow for easy unloading of concrete materials from the MOLF.

5.2.2 The concrete batching plant area is anticipated to be around 36,000m^2 and would comprise up to four or five batching plants at the peak concrete production of around 35,000m^3 per month with the largest being capable of producing 200m^3 per hour, down to the smallest unit producing 60m^3 per hour.

5.2.3 It is anticipated cement and other powdered cementitious materials would be delivered by ship (or road in prolonged periods of extreme weather) and then transferred through a closed system of heavy duty hoses to storage silos, using compressed air as a carrier medium. The silos would be vented to allow air to escape through dust mitigation systems to facilitate the control of dust/cement powder emissions.

5.2.4 The concrete batching plant would include embedded mitigation (i.e. measures to avoid or reduce environmental impact that can reasonably be

incorporated into the design of the scheme) to prevent or reduce emissions of dust as part of the design. These include enclosing the various parts of the plant, silos, and cement powder delivery systems fitted with suitable dust mitigation systems.

5.2.5 The unloading of cement at the MOLF would be made using mechanical equipment within an enclosed conveying system. Storage of the aggregate material will be within enclosed bays. It is anticipated the concrete would be transported across the site in concrete wagons.

5.2.6 The following good practice mitigation would also be implemented during the operation of the concrete batching plant to prevent or reduce emissions of dust:

- preventing spillages and cleaning any spillages as soon as reasonably practicable;
- carrying out visual inspections to identify any issues which are causing dust emissions;
- cleaning of surfaces to prevent dust being blown out of the batching plant area, especially when it is windy;
- locating stockpiles or dusty activities as far as practicable from nearby sensitive receptors;
- using water suppression during the loading and unloading of dry material and aggregates;
- using water suppression to dampen stockpiles of aggregate (where appropriate);
- using wheel wash facilities at the entrance/exit to the concrete batching plant working area;
- aggregate bays stocked to suitable heights beneath the bay wall tops to shield stockpiles from wind;
- bulk storage tanks and silos containing dry materials would be equipped with audible and/or visual high level alarms to warn of overfilling; and
- reducing drop heights by using variable height covered conveyors and enclosed chutes as part of the loading and unloading processes.

5.2.7 For use of the concrete batching plant during construction activities, all concrete batching equipment would be designed and operated in accordance with the most recent version of the Process Guidance Note 3/1 [RD17] for blending, packing, loading, unloading and use of cement, where relevant. The relevant mitigation for the concrete batching plant area is set out in the air quality management strategy in the Power Station Main Site sub-CoCP (Application Reference Number: 8.7)

5.3 Air quality monitoring programme and surveys

5.3.1 Given the scale and high-risk classification of the earthworks and construction activities, an appropriate monitoring programme will form a key part of the overall dust mitigation and management strategy. The approach and scope

of the air quality monitoring survey will be informed by the IAQM guidance on monitoring near demolition and constructions sites [RD16] which 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."*

5.3.2 The proposed monitoring programme would include the following.

Monitoring of particulates – human receptors

5.3.3 Continuous automatic monitoring of ambient particulate concentrations would be undertaken. This would include monitoring of PM_{10} and $PM_{2.5}$, and, depending on the selected technique, monitoring of total suspended particulates. Location(s) are likely to be at the Wylfa Newydd Development Area boundary closest to relevant sensitive human population areas which are downwind of the most frequently occurring wind direction, e.g. Tregele and Cemaes and also at a location close to the western Wylfa Newydd Development Area boundary where there are some human receptors. The monitoring locations are proposed within the Power Station Main Site sub-CoCP (Application Reference Number: 8.7).

5.3.4 The scope of the particulates monitoring and the setting of appropriate thresholds for identifying potential air quality effects and triggering a response mechanism are included as part of the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Power Station Main Site sub-CoCP (Application Reference Number: 8.7). The setting of thresholds would be informed by relevant guidance [RD16] or an agreed increase to or multiple of the baseline concentrations / relevant air quality guidelines as set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6).

5.3.5 Supplementary monitoring of weather conditions including wind speed, wind direction and rainfall would be undertaken.

5.3.6 The results of the continuous particulate monitoring (based on the real-time measurements) would be used to identify if the agreed thresholds have been exceeded. If the agreed thresholds are exceeded, then further investigation would be carried out to determine if additional action and mitigation is required

to reduce dust emissions from site activities as set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Power Station Main Site sub-CoCP (Application Reference Number: 8.7).

Dust deposition monitoring – human receptors

5.3.7 Dust deposition monitoring using passive dust deposition gauges at a number of locations at the Wylfa Newydd Development Area boundary close to sensitive human receptors, including upwind and downwind of the wind directions between the site and key receptor locations.

5.3.8 The scope of the dust deposition monitoring and the setting of appropriate thresholds for identifying potential dust soiling nuisance are included as part of the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Power Station Main Site sub-CoCP (Application Reference Number: 8.7).

5.3.9 The results of the dust deposition monitoring (based on monthly dust deposition sampling results) would be used to identify if the thresholds have been exceeded. If the agreed thresholds are exceeded, then further investigation would be carried out to determine if additional action or mitigation is required to reduce dust emissions from site activities as set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6).

Dust deposition monitoring – ecological receptors

5.3.10 Dust deposition monitoring using passive dust deposition gauges at a number of locations within or at the boundary of the Tre'r Gof SSSI and Cae Gwyn SSSI. Monitoring locations on the Wylfa Newydd Development Area boundary close to the Cemlyn Bay SAC and SSSI and other sites of lower sensitivity such as the Arfordir Mynydd y Wylfa - Trwyn Penrhyn Wildlife Site, Trwyn Pencarreg Wildlife Site, the Ancient Woodland and Cestyll Gardens would also be considered, if required. A period of baseline dust deposition monitoring would also be undertaken prior to the commencement of Main Construction (minimum of three months if practicable).

5.3.11 Dust depositing onto vegetation can physically smother the leaves affecting photosynthesis, respiration and transpiration. Environment Agency research [RD8] regarding dust deposition on vegetation suggests that deposition rates will have different effects based on the different types of vegetation present. For example, deposition rates as low as 70mg/m^2/day have been shown to have adverse effects on particularly sensitive lower plants, in this case *Sphagnum* moss. The document also included an upper range of 2,500mg/m^2/day for *Sphagnum* moss indicating a large range in deposition rates which could potentially cause effects.

5.3.12 The Environment Agency research [RD8] states that the literature indicates that a number of species appear to be affected by dust deposition at levels of 3,000mg/m^2/day or above. It also states that some species are unaffected until dust deposition rates are much higher than this.

5.3.13 The research also concluded that there is no sufficiently robust evidence to support a defined threshold below which most relatively insensitive species

would not be significantly affected by dust deposition. It suggests that, for most plant species indigenous to the UK, smothering effects are unlikely to significantly affect vegetation at dust deposition rates below 200mg/m^2/day.

5.3.14 The presence of *Sphagnum* spp. within the Cae Gwyn SSSI means the sensitivity of the site to dust deposition is considered to be very high as this is considered to be one of the most sensitive species to dust deposition. Although the Tre'r Gof SSSI does not contain the most sensitive species, such as mosses or lichens, its rich fen habitat includes the scarce marsh fern (*Thelypteris palustris*) which could potentially be sensitive to dust deposition.

5.3.15 The presence of vegetation which is sensitive to dust deposition at Cae Gwyn SSSI and Tre'r Gof SSSI and their respective location within or adjacent to the Wylfa Newydd Development Area, close to areas where large earthworks activities would be undertaken, means appropriate thresholds for dust deposition would be discussed and agreed with NRW and included as part of the air quality management strategy set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Power Station Main Site sub-CoCP (Application Reference Number: 8.7). These thresholds would be developed with reference to the Environment Agency research document [RD8].

5.3.16 Given the uncertainties and variability in the measured effects reported in the Environment Agency document, exceedance of any agreed dust deposition threshold would not be directly indicative of harm to the two sites. Ecological inspections will be undertaken at Tre'r Gof SSSI against which any adverse effects resulting from dust deposition during Main Construction can be identified. This will be used to identify if further action is required to prevent further dust deposition or damage to the vegetation. This will be achieved via additional mitigation, management or alteration of the dust causing activities, and through appropriate direct management practices within Tre'r Gof SSSI. These inspections could be extended to the other ecological sites of lower sensitivity as required.

6 Step 4 Determine significant effects

6.1 Human receptors

6.1.1 The assessment has identified that there are potentially sensitive dust receptors located on all sides of the Wylfa Newydd Development Area boundary (see figure 8-1), including residential properties and a primary school in Cemaes, and residential properties in Tregele, along the A5025 and as isolated properties in the wider area. There are 139 High sensitivity receptors located within 100m of the Wylfa Newydd Development Area, including 16 High sensitivity receptors located within 20m (see table 3-1). The receptor locations are reported from the site boundary and not the actual location of activities with the potential to generate dust. 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, is summarised in table 4-2 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.

6.1.2 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 Wylfa Newydd Development Area, with the receptors located to the east and northeast being downwind more frequently. The scale of the proposed works has been used to judge the dust emission magnitude, as being medium magnitude for demolition works and Large magnitude for earthworks, construction and trackout activities (table 4-1).

6.1.3 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, construction and trackout activities proposed are Low risk activities (see table 4-4) 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 AQO values set for the protection of human health. For potential dust soiling effects, it is considered that the earthworks and construction activities proposed are High risk activities (see table 4-4). There is the potential for infrequent, short-term episodes when baseline dust deposition rates could be increased by an amount that residents could perceive.

6.1.4 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 Power Station Main Site sub-CoCP (Application Reference Number: 8.7).

6.1.5 The Wylfa Newydd Development Area is a large construction site, but not unusual in scale in comparison with other major infrastructure projects. There are mitigation methods already available that have been successfully applied on other schemes to manage emissions of dust, such 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 Power Station Main Site sub-CoCP (Application Reference Number: 8.7). 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 off-site receptor, including those located within or adjacent to the Wylfa Newydd Development Area boundary.

6.1.6 This should be considered in conjunction with the analysis of local climatic and soil conditions (see section 2.4) which shows that the likelihood of dust being emitted by wind erosion and being transported to off-site receptor locations is relatively low.

6.1.7 The likely effect of dust emissions on human health (based on the IAQM guidance [RD1] and compliance with the AQOs) and amenity for the proposed scheme, with the mitigation strategies applied as specified in the air quality management strategy set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6), is concluded to be not significant.

6.2 Ecological receptors

6.2.1 The results for the ecological receptors indicate that there are High risks predicted for potential impacts from earthworks and construction activities at Tre'r Gof SSSI and Cae Gwyn SSSI. This is due to the identification of vegetation on the respective sites which are particularly sensitive to dust deposition and soiling, specifically mosses at Cae Gwyn SSSI and, as a precautionary approach, the ferns and other sensitive vegetation at Tre'r Gof SSSI. There is predicted to be a Low risk from earthworks and construction activities for the remaining sites.

6.2.2 The suite of good practice mitigation measures taken forward from this assessment are proposed to reduce the potential effects of dust soiling at ecological receptors to not significant.

6.2.3 The potential for significant effects at Tre'r Gof SSSI, Cae Gwyn SSSI and Cemlyn Bay SAC and SSSI are discussed in more detail below.

Tre'r Gof SSSI and Cae Gwyn SSSI

6.2.4 The location of Tre'r Gof SSSI within the Wylfa Newydd Development Area means the designated site is susceptible to experiencing potential increases in dust deposition due to the predominant wind direction (see table 2-1 and figure 2-1). Tre'r Gof SSSI is downwind of the predominant wind direction to the nearby landscape mounding area to the west of Cemaes and the more distant areas where earthworks and construction activities would be undertaken, such as the Power Station Site and laydown and landscape mounding area near Tregele.

6.2.5 However, the nearby landscape mounding (Mound A) west of Cemaes does not approach within approximately 100m of the south or east of the Tre'r Gof SSSI, meaning that the majority of any dust emitted from the mound creation and landscaping activities would be deposited before reaching the SSSI. The Site Campus at Wylfa Head would be approximately 50m north of the Tre'r Gof SSSI at its closest point (figure 8-1), and therefore the predominant wind direction from the south-southwest and southwest would generally transport any emitted dust from the Site Campus to the north-northeast and northeast away from the Tre'r Gof SSSI. Specific dust management and controls would be employed for the construction of the Site Campus to the northwest of the Tre'r Gof SSSI to prevent dust emissions. This would include measures such as locating material stockpiles as far away from Tre'r Gof SSSI as is feasible, and regular use of dust suppression equipment including water sprays on the stockpiles. The mitigation measures taken forward from this assessment would be included as part of the air quality management strategies set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Power Station Main Site sub-CoCP (Application Reference Number: 8.7).

6.2.6 For Cae Gwyn SSSI, which is adjacent to the southern boundary of the Wylfa Newydd Development Area, the area of sensitive *Sphagnum* moss is approximately 80m from the site boundary at its closest point. In this nearby part of the Wylfa Newydd Development Area, there are some earthworks activities required during the creation of the landscape mound (Mound C) adjacent to the site entrance. The predominant wind direction from the south-southwest and southwest would generally transport any emitted dust from the landscape mounding area away from the Cae Gwyn SSSI.

6.2.7 Table 2-2 illustrates that wind blowing from the directions which could transport any dust emitted from this nearby landscape mounding area during dry conditions towards the *Sphagnum* moss within the Cae Gwyn SSSI (i.e. winds blowing from the north-northeast to the east, representing the direction from where works would be closest to the ecological site) would occur for only approximately 14% of the year during dry conditions.

6.2.8 The works in this area would also be temporary during the initial soil stripping and subsequent mound creation. During this period, the mitigation measures taken forward from this assessment, including dust suppression and control measures and monitoring survey, would be focused on preventing dust emissions causing a significant effect at the Cae Gwyn SSSI. Once this area is completed, the nearest potentially dust generating activities would be much further away.

6.2.9 The chemical composition of the substrates on which sensitive flora are located could be changed if large amounts of dust with a lower pH (i.e. derived from acidic soils from another part of the Wylfa Newydd Development Area) were to be emitted and deposited onto the vegetation or ground, particularly for the Tre'r Gof SSSI which is an alkaline fen. Although the alkaline fen would offer some natural buffering against acidification, some plant species within the Tre'r Gof SSSI would be particularly sensitive to changes in pH, and both diversity and abundance could be negatively affected if this were to occur. The pH of the substrate and soils varies depending on location within the Wylfa Newydd Development Area, and therefore it would be necessary to control

dust emissions from material excavated from areas with a lower pH which would be transported and placed in the landscape mounding close to Tre'r Gof SSSI.

6.2.10 As discussed previously, the suite of good practice mitigation measures taken forward from this assessment) are proposed to reduce the potential effects of dust soiling at ecological receptors to not significant.

Cemlyn Bay SAC and SSSI

6.2.11 For Cemlyn Bay SAC and SSSI, the IAQM guidance [RD1] recommends the designated site can be screened out due to the distance from the Wylfa Newydd Development Area. Given the status of Cemlyn Bay SAC and SSSI, and the precautionary High risk identified for sensitivity to dust deposition, additional supplementary analysis has been undertaken to identify the potential for significant effects.

6.2.12 Cemlyn Bay SAC and SSSI is approximately 110m from the Wylfa Newydd Development Area at its closest point. A relatively large landscape mound (Mound E) is proposed to be formed within this western section of the Wylfa Newydd Development Area. The majority of any dust emitted from the mound creation activities would be deposited before reaching the SAC and SSSI. As noted previously, the types of vegetation within the Cemlyn Bay SAC and SSSI which are found in coastal areas, are unlikely to be highly sensitive to dust soiling or smothering.

6.2.13 Furthermore, as shown in table 2-2, the meteorological data analysis indicates that the wind that could transport any emitted dust from the landscape mound area towards the SAC and SSSI during dry conditions (i.e. wind blowing from the east-southeast through to the south) would occur for only approximately 8% of the time.

6.3 Conclusions

6.3.1 As discussed previously, 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 in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Power Station Main Site sub-CoCP (Application Reference Number: 8.7).

6.3.2 The IAQM guidance [RD1] recommends that the proposed mitigation ensures that any potential significant adverse effects will not occur, so the residual effects can be considered as not significant. However, even with a rigorous package of mitigation 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 Power Station Main Site sub-CoCP (Application Reference Number: 8.7), occasional impacts may occur. For example, where dust emissions occur under adverse weather conditions due to the failure of a dust control measure, local receptors may experience infrequent, short-term dust annoyance. The probable scale of this would not usually be considered adequate to alter the conclusion that, with mitigation in place, the potential effects would be not significant.

6.3.3 Therefore, the likely effect of dust emissions on human health (based on the IAQM assessment methodology [RD1] and compliance with the AQOs, amenity and ecological sites during Main Construction, with the mitigation strategies applied as specified in the air quality management strategy set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and the Power Station Main Site sub-CoCP (Application Reference Number: 8.7), is concluded to be not significant.

7 References

Table 7-1 Schedule of references

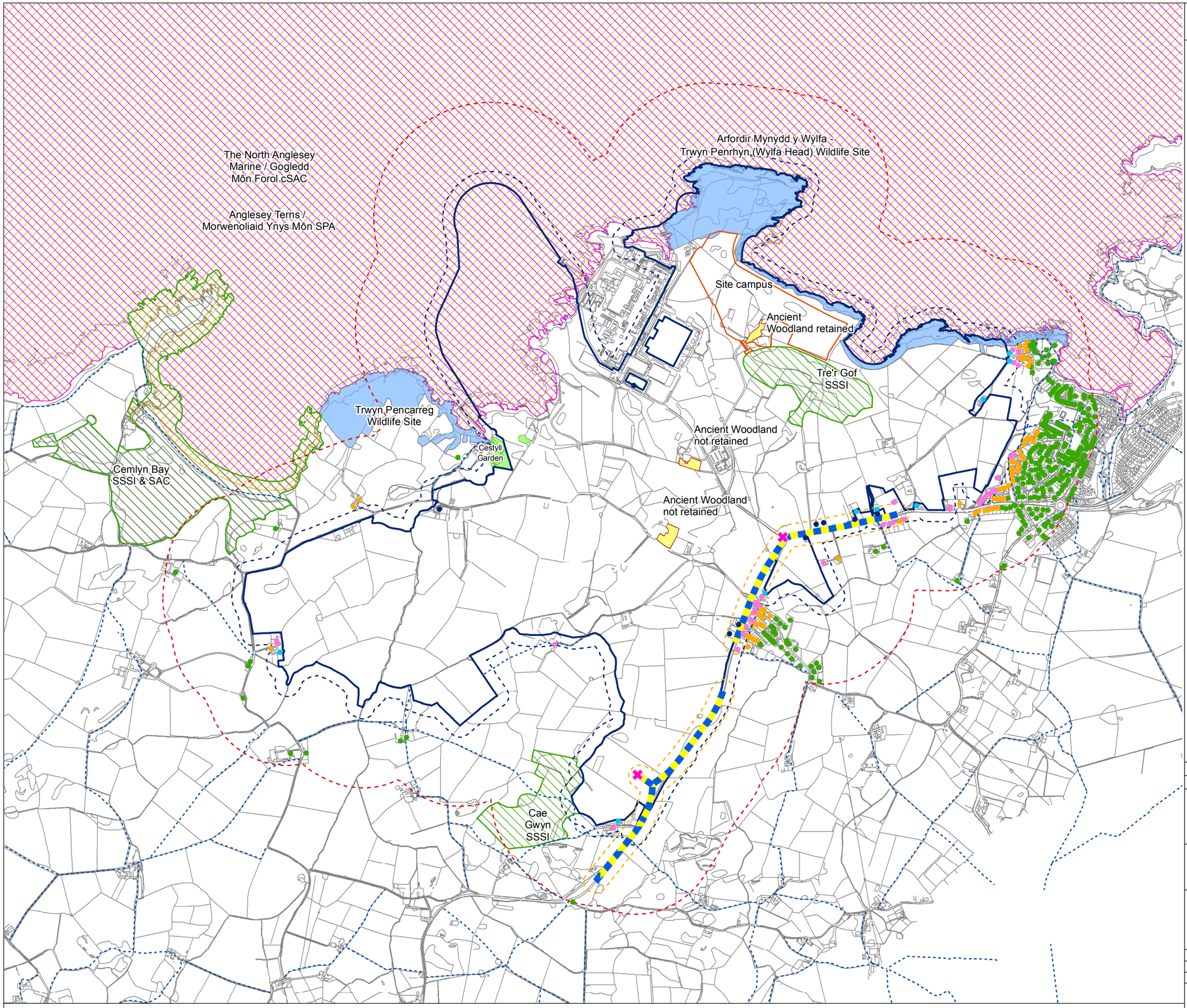
ID	Reference
RD1	Institute of Air Quality Management. 2016. *Guidance on the Assessment of Dust from Demolition and Construction Version 1.1*. Institute of Air Quality Management: London.
RD2	British Standards Institution. 1994. *BS 6069-2 Characterisation of Air Quality. Glossary*, 94th Edition, 15 August 15, 1994. British Standards Institution: London.
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. The Scottish Office Development Department: Edinburgh.
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. HMSO: London.
RD5	Isle of Anglesey County Council. 2014 *Air Quality Progress Report for Isle of Anglesey County Council*. Isle of Anglesey County Council: Llangefni.
RD6	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. and Shillito, D.E. Suggested guidelines for deposited ambient dust. Atmospheric Environment, 32(16): 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	National Soil Resources Institute. 2015. Soils Site Report, Full Site Report 5km x 5km. SH3591792942.
RD10	Reading Agricultural Consultants Ltd. 2015. Wylfa Nuclear Power Station Anglesey – Agricultural Land Classification and Soil Resources. Report Reference: RAC6753 June 2015.
RD11	Reading Agricultural Consultants Ltd. 2016. Wylfa Nuclear Power Station Anglesey – Agricultural Land Classification and Soil Resources. Report Reference: RAC6753 March 2016.
RD12	Department for Environment, Food and Rural Affairs. 2005. *Controlling soil erosion. Incorporating former advisory leaflets on grazing livestock, wind, outdoor pigs and the uplands*. Department for Environment, Food and Rural Affairs: London.

ID	Reference
RD13	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. Joint Nature Conservation Committee: Peterborough.
RD14	Meininger, C. A. and P.D. Spatt 1988. Variations of Tardigrade assemblages in dust-impacted arctic mosses. Arctic and Alpine Research20 (1): 24-30
RD15	Department for Environment Food and Rural Affairs. 2012. *Process Guidance Note 3/16(12) Statutory guidance for mobile crushing and screening*. Department for Environment, Food and Rural Affairs: London.
RD16	Institute of Air Quality Management. 2012. *Guidance on Air Quality Monitoring in the Vicinity of Demolition and Construction Sites*. Institute of Air Quality Management: London.
RD17	Department for Environment, Food and Rural Affairs. 2012. *Process Guidance Note 3/01(12) Statutory guidance for blending, packing, loading, unloading and use of cement*. Department for Environment, Food and Rural Affairs: London.

8 Figures

Figure 8-1 Construction dust assessment – study areas and human and ecological receptors

FIGURE 8-1



Legend

- Wylfa Newydd Development Area
- Construction dust assessment study area for ecological receptors (50m from the Wylfa Newydd Development Area)
- Construction dust assessment study area for human receptors (350m from the Wylfa Newydd Development Area)
- Construction dust study area (50m of the route(s) used by construction vehicles up to 500m from the site entrance)
- Public Rights of Way
- Access routes up to 500m from the site entrance
- Site entrance

Construction dust study area – human receptors (350m from the Wylfa Newydd Development Area)

- Within Wylfa Newydd Development Area boundary (categorised as 0-20m)
- 0-20m
- 20-50m
- 50-100m
- 100-350m

Ecological receptor

- Special Protection Area (SPA)
- Special Area of Conservation (SAC) / Candidate SAC (cSAC)
- Site of Special Scientific Interest (SSSI)
- Ancient Woodland
- Wildlife Site
- Registered Historic Park and Garden

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
0	NOV 17	Initial Issue	RM	DH	SB	RB

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT
ENVIRONMENTAL STATEMENT

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

Scale @ A3	1:16,000	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.		

Drawing No.: 60PO8077_DCO_VOL_D_APP_05_01_08_01