HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

6.2.5 ES Volume B – Introduction to the environmental assessments B5 – Air quality

PINS Reference Number: EN010007

Application Reference Number: 6.2.5

June 2018

Revision 1.0

Regulation Number: 5(2)(a)

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Horizon Internal DCRM Number: WN0902-JAC-PAC-CHT-00014

[This page is intentionally blank]

Contents

5 Air quality 1
5.1 Introduction 1
5.2 Legislation, policy and guidance 3
Key legislation *3*
Key policy *5*
Key guidance *9*
5.3 Consultation 10
Planning Inspectorate Scoping Opinion *10*
Statutory consultation *17*
Non-statutory consultation *24*
5.4 Topic-specific methodologies and assessment criteria 41
Introduction *41*
Assessment of parameters *41*
Receptor types *41*
Identification of study areas *42*
Identification of receptors *44*
Identification of baseline conditions *45*
Technical methodology *50*
Assessment of effects *69*
Inputs into the cumulative effect assessments *82*
Limitations *83*
5.5 References 85

[This page is intentionally blank]

5 Air quality

5.1 Introduction

5.1.1 This chapter provides an introduction to the technical basis for the air quality assessment for the Wylfa Newydd Project. It includes a summary of legislation, policy and guidance; key points arising in consultation that have guided the air quality assessment; and assessment methodologies and criteria.

5.1.2 The term 'air quality' refers to air pollution that could potentially affect health, such as emissions of air pollutants from car exhausts or industrial sources such as boilers. It also refers to dust, which could affect health or give rise to annoyance due to the soiling of surfaces through deposition. Both air pollution and dust could also affect sensitive plants and ecosystems. This assessment also considers potential releases of odorous substances, which may give rise to annoyance.

5.1.3 The potential emission sources of air pollutants and dust associated with the construction of the Power Station, Off-Site Power Station Facilities and Associated Development are set out below.

- Dust emissions generated by demolition, earthworks and construction-related activities (e.g. demolition of existing buildings, earthworks associated with remediation activities, vegetation and field boundary clearance, topsoil stripping and storage, bulk earthworks and deep excavations, rock processing, constructing buildings and use of concrete, construction of new roads and vehicle movements on dusty surfaces). Main Construction also includes emissions associated with the construction and operation of the Marine Off-Loading Facility and other marine structures.
- Emissions of odours from the excavation and remediation of areas containing ground contamination at the Wylfa Newydd Development Area and Off-Site Power Station Facilities only.
- Emissions of odours from the existing sewage treatment works and from a proposed package sewage treatment plant (Wylfa Newydd Development Area only).
- Emissions of pollutants to air from construction plant, machinery (primarily non-road mobile machinery) and marine vessels.
- Emissions of pollutants from road vehicles (e.g. cars, vans, buses and lorries) travelling on the local road network.

5.1.4 The potential sources of air pollutants associated with the operation of the Power Station, Off-Site Power Station Facilities and Associated Development are set out below:

- emissions of pollutants from the operation of combustion plant such as standby generators and steam-raising boilers; and

- emissions of pollutants from road vehicles travelling on the local road network.

5.1.5 The potential sources of air pollutants and dust associated with the decommissioning of the Power Station, Off-Site Power Station Facilities and Associated Developments are emissions of dust generated from decommissioning activities, including demolition of buildings and earthworks, and emissions of pollutants from plant, machinery, marine vessels and road vehicles.

5.1.6 The main air pollutants arising from the above are oxides of nitrogen (NOx), nitrogen dioxide (NO_2), carbon monoxide (CO), sulphur dioxide (SO_2) and particulate matter to include PM_{10} and $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 10 microns or less and 2.5 microns or less, respectively).

5.1.7 The term 'dust' refers to all particulate matter including all solid particles suspended in air, or settled and deposited onto a surface after having been suspended in air, due to activities related to construction. This includes the smaller-sized particles associated with potential health effects (i.e. PM_{10} and $PM_{2.5}$), and larger particles associated with causing annoyance or affecting sensitive vegetation through deposition onto a surface.

5.1.8 This assessment also includes potential releases of odorous substances which may cause annoyance. Emissions of NOx and SO_2 (and the associated nitrogen and acid deposition) may also affect sensitive vegetation. A description of these pollutants is provided in appendix B5-1 (Baseline Data Synopsis Report - Air Quality) (Application Reference Number: 6.2.18).

5.1.9 The air quality assessment has some key linkages to other topic chapters within the Environmental Statement, which include:

- traffic and transport (C2, Application Reference Number: 6.3.2) – sets out proposed traffic flows which are relied upon for the air quality assessment process;
- soils and geology (D7, Application Reference Number: 6.4.7; E7, Application Reference Number: 6.5.7; F7, Application Reference Number: 6.6.7; G7, Application Reference Number: 6.7.7; and G7, Application Reference Number: 6.8.7) – includes an assessment of the potential air quality effects of mobilising ground contamination;
- terrestrial and freshwater ecology (D9, Application Reference Number: 6.4.9; E9, Application Reference Number: 6.5.9; F9, Application Reference Number: 6.6.9; G9, Application Reference Number: 6.7.9; and G9, Application Reference Number: 6.8.9) and marine environment (D13, Application Reference Number: 6.4.13) – includes an assessment of potential air quality effects on ecological receptors based on the changes in air quality; and
- Health Impact Assessment Report (Application Reference Number: 8.19) – this report presents further details on the potential health effects associated with the predicted changes in air pollution.

5.1.10 With regard to the determination of the significance of air quality effects, the assessment methodology differs from that described in chapter B1 (introduction to the assessment process) (Application Reference Number: 6.2.1) of this Environmental Statement, as defining a level of significance beyond either 'significant' or 'not significant' is not appropriate for air quality effects. The full details of how the significance of the air quality effects has been determined are set out in this chapter (see paragraphs 5.4.107 to 5.4.150).

5.1.11 The assessment of effects for air quality is included in the following chapters:

- C4 (Application Reference Number: 6.3.4) for the project-wide road traffic effects;
- D5 (excluding emissions from traffic) (Application Reference Number: 6.4.5) for the WNDA Development;
- E5 (Application Reference Number: 6.5.5) for the Off-Site Power Station Facilities;
- F5 (Application Reference Number: 6.6.5) for the Park and Ride;
- G5 (Application Reference Number: 6.7.5) for the A5025 Off-line Highway Improvements; and
- H5 (Application Reference Number: 6.8.5) for the Logistics Centre.

5.2 Legislation, policy and guidance

5.2.1 The following legislation, policy and guidance have been used to inform the scope and content of the air quality assessment; assist in the identification of potential effects and mitigation; and influence the design of the Wylfa Newydd Project to reduce the significance of effects.

Key legislation

5.2.2 The relevant legislation and how it relates to the air quality assessment are set out in table B5-1.

Table B5-1 Summary of key legislation

Legislation	Description
Environment Act 1995	This Act introduced a system of Local Air Quality Management (LAQM) in the UK. This requires local authorities to review and assess air quality within their boundaries regularly and systematically against Air Quality Objectives (AQOs), appraise development and transport plans against these assessments, and make plans to meet the AQOs where these are exceeded. Where relevant, the air quality assessment would demonstrate the potential interaction with the LAQM process being undertaken by local authorities.

Legislation	Description
Environmental Protection Act 1990 Part III	This Part defines statutory nuisance, and provides the principal controls over it for local authorities. Under the Act, local authorities have a duty to inspect their areas to detect nuisances, and when satisfied that a statutory nuisance exists or is likely to occur or recur, to serve an abatement notice on the responsible party. They also have a duty to investigate any complaint made by a person living within their area. Though businesses have a defence of 'best practicable means', failure to comply with a notice is a criminal offence.
The Air Quality (Wales) Regulations 2000 and Air Quality (Amendment) (Wales) Regulations 2002	These Regulations legislate for the AQOs for pollutants set out in the 2000 Air Quality Strategy, which was revised in 2007 [RD1]. AQOs exist for NOx, NO_2, CO, SO_2 and PM_{10}. These are established for both the protection of human health and the protection of vegetation and ecosystems (see table B5-14 and table B5-17). The air quality assessment makes a comparison between the predicted concentrations of these pollutants resulting from the proposed works against their relevant AQOs, and taking existing levels into account.
The Air Quality Standards (Wales) Regulations 2010	These Regulations have the objective to improve air quality by reducing the impact of air pollution on human health and ecosystems. These standards include limit values, target values and critical levels for pollutants relevant to this assessment including CO, NOx, NO_2, PM_{10}, $PM_{2.5}$ and SO_2. The Regulations transpose the air quality limit values set out in the European Union (EU) Ambient Air Quality Directive (2008/50/EC) into UK law. The UK Government is responsible to the European Commission (EC) for ensuring that it complies with the provisions of EU Directives. On the UK Government's behalf, the Department for Transport and the Department for Environment, Food and Rural Affairs (Defra) have Public Service Agreements relating to EU limit values.
The Conservation of Habitats and Species Regulations 2017	These Regulations implement the provisions of the Habitats Directive (92/43/EEC) and the Birds Directive (2009/147/EC). They provide for the designation and protection of European Designated Sites and species, and the adaptation of planning and other controls for the protection of European Designated Sites.

Key policy

5.2.3 The relevant national and local plans and policies, and how these relate to the air quality assessment, are described in table B5-2.

Table B5-2 Summary of key policy

Policy	Description
National policy	
Overarching National Policy Statement for Energy (EN-1) (NPS EN-1) [RD2]	This NPS, designated by the Secretary of State in July 2011, sets out the overarching national policy for delivery of major energy infrastructure projects. NPS EN-1 states in section 5.2 that where a project is likely to have adverse effects on air quality, an assessment should be undertaken. Paragraph 5.2.7 states the assessment should describe significant air emissions, and also significant emissions from road traffic generated by a project. Paragraph 5.2.7 sets out that the applicant should provide a description of the existing air quality levels and relative changes to be included within the assessment, and that proposed mitigation and residual effects should also be described. In addition, NPS EN-1 (paragraph 5.2.3) also specifies that the potential effects on sensitive ecological habitat sites should be considered. These key elements are considered within the assessment set out in this chapter. Important aspects from NPS EN-1 that have been taken into account in the assessment and mitigation proposals are reproduced below. Chapter 5.2 states: “The IPC [Infrastructure Planning Commission] should generally give air quality considerations substantial weight where a project would lead to a deterioration in air quality in an area, or leads to a new area where air quality breaches any national air quality limits. However, air quality considerations will also be important where substantial changes in air quality levels are expected, even if this does not lead to any breaches of national air quality limits.” Chapter 5.2 also states: “In all cases the IPC must take account of any relevant statutory air quality limits. Where a project is likely to lead to a breach of such limits

Policy	Description
	the developers should work with the relevant authorities to secure appropriate mitigation measures to allow the proposal to proceed. In the event that a project will lead to non-compliance with a statutory limit the IPC should refuse consent."
National Policy Statement for Nuclear Power Generation (EN-6) (NPS EN-6) [RD3]	This NPS designated by the Secretary of State in July 2011 that sets out national policy on new nuclear power stations identified as potentially suitable for deployment by 2025. Volume 1 of NPS EN-6 (chapter 3.12) states that the operation of a new nuclear power station is unlikely to be associated with significant air quality effects, but highlights that consideration should also be given to potential effects from transport and associated activities during construction. It goes on to state: "With appropriate mitigation, the subsequent effect of these potential impacts on human health is unlikely to be significant." Key policy concerns relate to human health effects, damage to habitats and loss of amenity due to dust deposition. As with the NPS EN-1, these key elements are considered within the assessment set out in this chapter. No specific air quality effects are described for the Wylfa Newydd Project within volume 2 of NPS EN-6, but it does refer to the potential for adverse effects at nearby European Designated Sites and other ecologically sensitive areas (annex C.9).
Planning Policy Wales (Edition 9) [RD4]	This Document sets out the land use planning policies of the Welsh Government, forming a strategic framework to guide development. Chapter 13 (Minimising and Managing Environmental Risks and Pollution) states that where pollution is considered (with the need to comply with statutory environmental quality standards/objectives in relation to the use or development of land), this can be a material planning consideration. Planning Policy Wales extends this to the AQOs and the potential effect upon local authority air quality action plan improvements (through the LAQM process).
Technical Advice Note 18: Transport [RD5]	There are no Technical Advice Notes for air quality specifically, but Technical Advice Note 18 [RD5] (relating to the assessment of road traffic

Policy	Description
Technical Advice Note 5: Nature Conservation and Planning [RD6] *Minerals Technical Advice Note (Wales) 1: Aggregates* [RD7]	effects) and Technical Advice Note 5 [RD6] (relating to effects on habitats and ecosystems) are relevant. The Minerals Technical Advice Note on aggregates extraction [RD7] is also potentially of relevance given the proposed topsoil works, earthworks and rock excavation. This states that where dust is demonstrated to have the potential to affect the use of land, it can be a material planning consideration. The Technical Advice Note also sets the scope for the use of appropriate planning conditions to control activities and protect against dust emissions.
The Air Quality Strategy for England, Scotland, Wales and Northern Ireland [RD1]	The Air Quality Strategy sets out a framework of standards and objectives for the critical air pollutants, with the aim of reducing the number and extent of episodes of air pollution. It sets out a way forward for planning air quality issues, new air quality standards, a policy framework for tackling fine particles, and new national policy measures which could move the UK closer towards meeting the Air Quality Strategy's objectives.
Local Air Quality Management in Wales [RD8]	The guidance is for local authorities in Wales and covers the policy aspects relating to LAQM. It describes the streamlined LAQM process and states that air quality management is a public health priority. It states that: "For Local Authorities to be effective in working towards the national air quality objectives, LAQM must encompass more than just Local Authorities' functions under Part IV of the 1995 Act [Environment Act 1995]. The exercise of those functions must be properly joined up with the management of local air quality under the land use and transport planning, environmental permitting and statutory nuisance regimes, as well as with the carrying out of any other activities, not confined to the public sector, which have a bearing on local air quality." The policy guidance links to the Well-being of Future Generations (Wales) Act 2015 and the adoption of the five ways of working set out in the Act when carrying out LAQM. The guidance states that the national AQOs are not 'safe' levels of air pollution and that air quality just compliant with the AQOs carries health risks.

Policy	Description
	It also describes that NO_2 and particulates ($PM_{2.5}$ and PM_{10}) currently have no safe threshold defined and the lower concentration of these pollutants the lower the risks of adverse health effects. It states: "Therefore, while compliance with the national air quality objectives is essential, it is desirable to keep levels of pollution as low as reasonable practicable."
Local policy	
New Nuclear Build at Wylfa: Supplementary Planning Guidance [RD9]	The purpose of this Supplementary Guidance is to provide advice on important local matters relating to the proposed Wylfa Newydd Project and to set out the Isle of Anglesey County Council's (IACC's) response to national and local policy and strategies in the context of the Wylfa Newydd Project. Guiding Principle 7 (Protecting Health) states that the IACC expects the project promoter to undertake comprehensive assessments of the health and amenity effects of the construction and operation of the Wylfa Newydd Project, and that it would seek to impose planning conditions to cover aspects such as dust management. Guiding Principle 26 (Wylfa NNB Main Site – Key Development Principles) states that the IACC would expect the Wylfa Newydd Project promoter to assess measures to reduce disturbance-related activities such as emissions to air from construction activity and heavy goods vehicle (HGV) movements. Guiding Principle 26 also states that appropriate mitigation should be adopted to avoid adverse effects on sensitive ecological sites such as Natura 2000 sites and nationally designated sites.
Anglesey and Gwynedd Joint Local Development Plan (JLDP) 2011 – 2026 - Written Statement [RD10]	The JLDP covers the local authorities of the IACC and Gwynedd Council and forms the basis for land use planning in these areas. The JLDP covers the period 2011 to 2026. Policy PCYFF 2 (Development Criteria) of the JLDP relates to planning applications and states that permission would be refused where development would have an unacceptable impact on the health, safety and amenity of occupiers of local residences and property users with regard

Policy	Description
	to dust, fumes and other forms of pollution or nuisance. Policy PS5 (Sustainable Development) states that all proposals should protect and improve the quality of the natural environment and avoid pollution.

Key guidance

5.2.4 The air quality assessment has been undertaken in line with a number of key technical guidance documents. These guidance documents are widely used across the UK and represent standard good practice for the assessment for the various consenting regimes. These are summarised in table B5-3.

Table B5-3 Summary of key guidance

Guidance	Description
Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) *Land-Use Planning and Development Control: Planning for Air Quality* [RD11]	This document contains advice on the need for an air quality assessment with regard to traffic emissions and combustion plant, selection of modelling methodologies, how to describe air quality effects, and advice on determining the significance of air quality effects.
IAQM Guidance on the assessment of dust from demolition and construction [RD12]	This document contains guidance for undertaking a risk-based appraisal of dust from demolition and construction-related activities, and assigning an appropriate level of dust control and mitigation. It includes recommended dust mitigation measures, monitoring and an approach for determining the significance of effects from dust emissions. It also includes advice on identifying the need to undertake an assessment of emissions to air from construction plant and machinery.
Defra *Local Air Quality Management: Technical Guidance (TG16)* [RD13]	This is designed to guide local authorities through the LAQM process and includes detailed technical guidance on air quality screening, modelling and assessment. It also provides guidance on where the AQOs apply.
Environment Agency *Air Emissions Risk Assessment for your Environmental Permit* [RD14]	This is part of the Environment Agency guidance (adopted by Natural Resources Wales (NRW)) on risk assessment and gives advice on assessing the effect of releases to air from listed activities when applying for an Environmental Permit. This document includes technical guidance on modelling, Environmental Assessment Levels

Guidance	Description
	(EALs) and criteria for helping to identify the significance of air quality effects.
IAQM Guidance on the assessment of odour for planning [RD15]	This document contains guidance for undertaking a risk-based assessment of odour emissions. It includes the selection of modelling methodologies, how to describe air quality effects, and advice on determining the significance of air quality effects.

5.3 Consultation

5.3.1 This section provides a topic-specific account of scoping, statutory and non-statutory consultation undertaken to support the assessment. For a full overview of the environmental consultation activities undertaken for the Wylfa Newydd Project, refer to chapter A6 (EIA Scoping Report and Addendum) (Application Reference Number: 6.1.6) and chapter A7 (consultation with environmental stakeholders) (Application Reference Number: 6.1.7).

Planning Inspectorate Scoping Opinion

5.3.2 In March 2016, Horizon submitted an updated Wylfa Newydd Project EIA Scoping Report to the Planning Inspectorate. In May 2017, Horizon submitted an Addendum to the March 2016 Wylfa Newydd Project Environmental Impact Assessment (EIA) Scoping Report to the Planning Inspectorate. Following a period of consultation with stakeholders, a further Scoping Opinion was received from the Secretary of State (via the Planning Inspectorate) on 14 June 2017.

5.3.3 The Wylfa Newydd Project EIA Scoping Report, Addendum and the subsequent Scoping Opinions inform the approach to the assessment. B5-4 provides an account of how comments raised by stakeholders in the Scoping Opinion have been considered in the air quality assessment.

Table B5-4 Key issues raised through scoping

Key issue raised	Action taken
The approach to the air quality assessment, including the establishment of the baseline environment, the proposed assessment methodology and any mitigation measures, should be agreed with the IACC and NRW. (Planning Inspectorate)	The approach to the assessment has been agreed with the Environmental Health Officer (Sustainable Development Department) of the IACC and also with NRW (see table B5-10).
The baseline environment described is based on monitoring undertaken by the IACC and background maps. The Environmental Statement	See paragraphs 5.4.24 to 5.4.50, which provide the approach to the characterisation of the baseline air quality environment. A baseline report has been produced and provides details

Key issue raised	Action taken
should explain how the IACC data are relevant to the proposed development by providing details of the locations and timings of monitoring, as well as the results where relevant. The assessment should ensure that the baseline data are up to date and relevant to the Project, taking into account the closure and decommissioning of the Existing Power Station. A description of the baseline, with appropriate cross-referencing to the separate report, should be provided. The one location where the NO_2 annual mean AQO was not met should be clearly identified and details provided. (Planning Inspectorate)	of monitoring and how it is relevant to the air quality assessment (see appendix B5-1, Application Reference Number: 6.2.18), including how the data have been used within the air quality assessments. A description of the baseline air quality relevant to each element of the Wylfa Newydd Project is also provided in the assessment chapters C4 (Application Reference Number: 6.3.4), D5 (Application Reference Number: 6.4.5), E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5). Information relating to the exceedance of the NO_2 annual mean AQO is provided in chapter B5 (Application Reference Number: 6.2.5) and appendix B5-1 (Application Reference Number: 6.2.18). Assessment of road traffic emissions at this location is also provided in chapter C4 (Application Reference Number: 6.3.4).
Human and ecological receptors and study areas should be agreed with the IACC and NRW. The locations and sensitivities of such receptors should be identified, using figures where appropriate. (Planning Inspectorate and the IACC)	The study areas and the methodology/source data for identifying human and ecological receptors within the study areas were agreed with the Environmental Health Department of the IACC and NRW. Other councils on mainland Wales were also consulted on this, including Gwynedd Council (GC), Conwy County Borough Council (CCBC), Denbighshire County Council (DCC) and Flintshire County Council (FCC).
The Environmental Statement should include an assessment of air pollutants from marine vessels and a description of the methodology used. (Planning Inspectorate and the IACC)	The emissions from marine vessels are included in the assessment of emissions during construction at the Wylfa Newydd Development Area. The methodology is discussed in this chapter, and more details of the assessment and methodology are provided in chapter D5 (Application Reference Number: 6.4.5) and appendix D5-2 (Main site

Key issue raised	Action taken
	Construction Phase Air Dispersion EIA - Final Modelling Report (Air Quality), Application Reference Number: 6.4.21).
Consideration should be given to assessing deposition at ecological receptors with reference to relevant critical levels and loads, referring to the terrestrial and freshwater ecology chapter where appropriate. (Planning Inspectorate and NRW)	A detailed assessment of pollutant concentrations and deposition at ecological receptors has been carried out. The ecological receptors and critical loads used in the assessment have been discussed and agreed with NRW (see table B5-10). Where required, further assessment has been undertaken, with cross-reference, in the terrestrial and freshwater ecology chapter (see chapter D9 terrestrial and freshwater ecology, Application Reference Number: 6.4.9).
A dust management plan and any other mitigation measures relied upon should be detailed within the Environmental Statement and adequately secured. A draft version of the plan should be provided with the application for development consent. (Planning Inspectorate and the IACC)	The relevant dust and pollutant mitigation measures are detailed within the air quality assessment chapters C4 (Application Reference Number: 6.3.4), D5 (Application Reference Number: 6.4.5), E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5) of the Environmental Statement. The Wylfa Newydd Code of Construction Practice (CoCP) (Application Reference Number: 8.6) and sub-CoCPs (Application Reference Numbers: 8.7 to 8.12) and Wylfa Newydd Code of Operational Practice (CoOP) (Application Reference Number: 8.13) are provided with the application for development consent, and these set out details of the mitigation measures which would be delivered during construction and operation respectively.
Study areas for the different activities, dust emissions during construction, construction impacts and operational impacts should be explained. (Planning Inspectorate)	How the study areas are defined is described in paragraphs 5.4.7 to 5.4.14 with details of the specific area for each assessment described in the chapters C4 (Application Reference Number: 6.3.4), D5 (Application Reference Number: 6.4.5), E5 (Application

Key issue raised	Action taken
	Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5).
The parameters used for dispersion modelling of combustion emissions should be defined. The implications of stack height and dispersion should be clearly explained. The dispersion modelling should consider a range of possibilities and seek to ensure that the 'worst case' scenario is assessed, for example the worst case may occur as a short-term impact. (Planning Inspectorate)	A number of modelling scenarios have been included in the assessment to cover the worst case long-term and short-term effects for construction and operation of the Power Station. Information on the emission scenarios is provided in chapter D5 (Application Reference Number: 6.4.5) with all emissions modelling parameters provided in appendix D5-2 (Application Reference Number: 6.4.21) and appendix D5-3 (Main Site Operational Dispersion - EIA - Dispersion Modelling Report of the Emissions to Air Arising from Operational Combustion Plant (Scenarios to Support Development Consent Order (DCO) Application), Application Reference Number: 6.4.22). The determination of the suitable stack heights for the combustion plant associated with the operation of the Power Station has been carried out to identify appropriate stack heights; further details are provided in chapter D5 (Application Reference Number: 6.4.5). The assessment was based on a worst-case approach with regard to stack height and building heights within the parameter based approach as described in chapter D5 (Application Reference Number: 6.4.5).
Detail the methodologies used and clearly explain how the levels of significance (in EIA terms) will be established. (Planning Inspectorate and the IACC)	The modelling and assessment methodologies, including assessment criteria and determination of significance, are described in the technical methodology and assessment of effects sections of this chapter. Further details of the methodologies, including the basis of the design used for the assessment and assessment scenarios, are provided in the chapters C4 (Application Reference Number:

Key issue raised	Action taken
	6.3.4), D5 (Application Reference Number: 6.4.5), E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5) and accompanying appendices.
Monitoring of air quality should be undertaken and the details of monitoring should be provided. (Planning Inspectorate)	An air quality monitoring survey was initiated with the IACC in February 2016 to characterise the baseline air quality (see appendix B5-1, Application Reference Number: 6.2.18). Details of the proposed air quality monitoring during construction and operation are provided in the air quality management strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and sub-CoCPs (Application Reference Numbers: 8.7 to 8.12) and the air quality strategy within the Wylfa Newydd CoOP (Application Reference Number: 8.13).
Reference should be made to the travel plan which proposes a range of sustainable transport options for staff and visitors and which may mitigate the potential for effects upon air quality that may otherwise arise from road transport. (The IACC)	Reference has been made to traffic and transport management strategy, set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and sub-CoCPs (Application Reference Numbers: 8.7 to 8.12) and traffic and transport management strategy in the Wylfa Newydd CoOP (Application Reference Number: 8.13) in the Environmental Statement (see chapter C4, Application Reference Number: 6.3.4). These transport strategies would manage traffic movements on local roads to mitigate adverse effects on the network. Chapter C4 (Application Reference Number: 6.3.4) also includes details of other measures to mitigate the potential effects upon air quality from road transport for the construction and operation phase. Reference should also be made to chapter C2 (traffic and transport, Application Reference Number: 6.3.2).
Clarification of where NO_2 monitoring has been	A baseline report has been produced which provides details of monitoring and

Key issue raised	Action taken
undertaken and how the baseline will be established where monitoring has not been undertaken is required. The methodology for establishing the baseline should be agreed with the relevant consultees and explained within the Environmental Statement, including at the Associated Development sites. (Planning Inspectorate)	how it is relevant to the air quality assessment (see appendix B5-1, Application Reference Number: 6.2.18). This was sent to the relevant consultees and explains how the existing baseline data have been used within the air quality assessments. A description of the baseline air quality relevant to each element of the Wylfa Newydd Project is also provided in the chapters C4 (Application Reference Number: 6.3.4), D5 (Application Reference Number: 6.4.5), E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5).
Where the monitoring data coverage does not extend to the Associated Development sites, but the results are extrapolated for use within the assessment, the Environmental Statement should justify the use of the data. (Planning Inspectorate)	
Emissions of pollutants from construction works at the Associated Development sites are noted as being small scale. The assessment approach should be justified given the rural nature of the receiving environment. (Planning Inspectorate)	A description of the assessment of pollutant emissions from construction plant and machinery for the construction of the Off-Site Power Station Facilities and Associated Development is provided in the chapters E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5).
It is welcomed that the Applicant intends to agree with relevant consultees the approach to take into account uncertainty in predicting road vehicle emissions. (Planning Inspectorate)	The method for verification of the modelling of road traffic emissions was confirmed with the relevant consultees through the issuing of the updated air quality assessment methodology report in May 2017 [RD16].
It is recommended that the assessment years are agreed with relevant consultees. (Planning Inspectorate)	The proposed model scenarios and assessment years were agreed with the relevant consultees through the issuing of the updated air quality assessment methodology report in May 2017 [RD16]

Key issue raised	Action taken
The IACC expressed that an appropriate level of assessment be undertaken based on the outcome of the assessment of odour sources at the Wylfa Newydd Development Area and that the sewage treatment works be operated in accordance with Defra code of practice on odour nuisance from sewage treatment works. (The IACC)	The assessment of odour sources is presented in chapter D5 (Application Reference Number: 6.4.5), together with the mitigation required to ensure odour effects would not be significant at on- and off-site locations.
Appropriate measures/controls should be adopted during the remediation and transport of contaminated materials. (The IACC)	Appropriate mitigation measures relating to the prevention of contamination during the remediation works are set out in the waste and materials management strategy, including soils and land contamination, within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and relevant sub-CoCPs (Application Reference Numbers: 8.7 and 8.9).
The IACC advised that consideration be given within the assessment of road traffic emissions to relevant short-term exposure locations close to the A55. (The IACC)	The assessment considers both long-term and short-term exposure locations close to the affected road network, including the A5025 and A55 (see chapter C4, Application Reference Number: 6.3.4).
The SO_2 concentrations in the vicinity of the Wylfa Newydd Development Area due to emissions of construction plant/machinery and marine vessels should be reviewed against the use of the critical level for NOx relevant to where concentrations of SO_2 are below their critical levels. (NRW)	This is considered within the assessment presented in chapter D5 (Application Reference Number: 6.4.5).
The Environmental Statement should assess the potential air quality effects on relevant ecological sites (Sites of Special Scientific Interest	Consideration of the potential effects at the relevant ecological sites is included within the assessment chapters E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number:

Key issue raised	Action taken
(SSSIs), Special Areas of Conservation (SACs), Special Protection Area (SPAs) and Ramsar sites) as a result of the construction, operation and decommissioning of the Associated Development. (NRW)	6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5).

Statutory consultation

Pre-Application Consultation Stage One

5.3.4 The aim of Pre-Application Consultation Stage One, undertaken in late 2014, was to share information available at the time with Horizon's key consultees and stakeholders, in order to consider feedback in ongoing design development. Table B5-5 outlines how key issues raised during Pre-Application Consultation Stage One have been considered in the assessment.

Table B5-5 Key issues raised during Pre-Application Consultation Stage One

Key issue raised	Action taken
Communities within a 5km radius of the Wylfa Newydd Development Area would be affected for an extended period of time during construction; accordingly, early and detailed consideration of these effects and their mitigation was sought through specific impact studies. (The IACC)	A detailed assessment of the potential air quality effects has been undertaken at all human receptors within 2km of the Wylfa Newydd Development Area for the assessment of emissions of dust and air pollutants during construction. The assessment demonstrated that any effects beyond 2km from the Wylfa Newydd Development Area would be negligible (see chapter D5, Application Reference Number: 6.4.5). Therefore, the effects at receptors up to 5km (and beyond) from the Wylfa Newydd Development Area have been considered and the effects would remain negligible. The assessment of road traffic emissions considered locations in close proximity to the road network at various locations within and beyond 5km of the Wylfa Newydd Development Area.
Detailed information is required within each of the environmental topic areas to enable further, more detailed	A detailed baseline air quality report is included in appendix B5-1 (Application Reference Number:

Key issue raised	Action taken
comments on likely effects identified and the acceptability of proposed mitigation. (The IACC)	6.2.18). Detailed information is also provided on the potential effects of the construction and operation of the Power Station, Off-Site Power Station Facilities, Associated Development and the A5025 Off-line Highway Improvements, and proposed mitigation in chapters C4 (Application Reference Number: 6.3.4), D5 (Application Reference Number: 6.4.5), E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5).
Concern related to the potential adverse effects on statutory protected sites. In particular, Tre'r Gof SSSI was highlighted. (NRW)	Assessments of the potential effects of dust and air pollutant emissions at Tre'r Gof SSSI and all other relevant ecological receptors within the study areas are provided in chapters C4 (Application Reference Number: 6.3.4), D5 (Application Reference Number: 6.4.5), E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5).

Pre-Application Consultation Stage Two

5.3.5 In September 2016, Horizon shared a Preliminary Environmental Information Report as part of Pre-Application Consultation Stage Two. This presented preliminary details of the predicted environmental effects and mitigation measures for any adverse effects identified. Table B5-6 outlines how key issues raised during Pre-Application Consultation Stage Two have been considered in the assessment.

Table B5-6 Key issues raised during Pre-Application Consultation Stage Two

Key issue raised	Action taken
Methodology and results of the assessment Various concerns were raised regarding aspects associated with the assessment methodologies and results presented in the Preliminary	The various concerns were addressed as part of the detailed assessments presented in chapters C4 (Application Reference Number: 6.3.4) and D5 (Application Reference Number: 6.4.5).

Key issue raised	Action taken
Environmental Information Report. These primarily related to the Wylfa Newydd Development Area and road traffic emissions on the road network, and included: • the importance of considering effects on SSSIs; • the potentially significant effects and exceedances of the AQOs identified for the construction phase; • lack of detailed information on assessment approach, methodologies and results; • the significance criteria used in the assessment and conclusion in relation to the significance of the effect of road traffic emissions; • requesting that the emissions from construction plant and operational combustion plant should be assessed in combination with emissions from road traffic; • clarification that the road traffic emissions modelling has been verified using roadside pollutant measurement data; • inclusion of the assessment of 24-hour mean NOx concentrations; • the extent of the study area for the assessment of road traffic emissions; and • due consideration of the effects of the A5025 Off-line Highway Improvements. (The IACC, Public Health Wales and NRW)	• Detailed assessments of the effects at ecological receptors, including SSSIs, were undertaken and can be seen in chapters C4 (Application Reference Number: 6.3.4) and D5 (Application Reference Number: 6.4.5). • Appropriate additional mitigation has been proposed where potentially significant effects, including exceedances of the AQOs, were identified. • Full details of the assessment methodology, assessment and significance criteria, input data, assumptions and results are provided in this chapter and also in chapters C4 (Application Reference Number: 6.3.4) and D5 (Application Reference Number: 6.4.5). • Emissions from construction plant and operational combustion plant were assessed in combination with emissions from road traffic and can be seen in chapters C4 (Application Reference Number: 6.3.4) and D5 (Application Reference Number: 6.4.5). • The road traffic emissions dispersion modelling and screening assessment were verified against monitoring data recorded adjacent to the A5025 and A55. • The assessment includes consideration of the 24-hour mean NOx concentrations (see chapter D5, Application Reference Number: 6.4.5). • The study area for road traffic emissions extends onto mainland Wales where traffic flow increases are above the relevant criteria for identifying where a quantitative assessment is required. The

Key issue raised	Action taken
	assessment is provided in chapter C4 (Application Reference Number: 6.3.4). • Chapter C4 (Application Reference Number: 6.3.4) includes a detailed assessment of road traffic emissions and the effects of the A5025 Off-line Highway Improvements before and after construction has been completed.
Plant selection for boilers and standby generators NOx and sulphur emissions should be considered when selecting equipment and fuels. Equipment should be powered by mains electricity where possible and low NOx emission boilers should be used. (The IACC)	Emissions of pollutants, including NOx, will be considered as an important criterion in the selection of combustion equipment and their fuel, as will measures to control NOx generation, including the use of low-NOx burners in boilers. Use of ultra-low sulphur diesel is proposed for the boilers and standby generators. It is always the intention to use mains electricity to power equipment; the standby generation plant is only there for emergency use when the mains electricity is not available.
Mitigation – emissions of dust Appropriate dust mitigation and controls should be developed. NRW should be consulted on dust mitigation measures (NRW)	Mitigation measures have been specified for the control of dust emissions, and described in chapters D5 (Application Reference Number: 6.4.5), E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5). A monitoring programme, also described in the above chapters, would be developed. The mitigation measures would be submitted to the IACC and NRW for consultation as part of this application.
Mitigation – road traffic	Mitigation to reduce traffic flows is embedded within the design of the Wylfa Newydd Project, including

Key issue raised	Action taken
Mitigation measures should be considered to reduce construction traffic volumes and/or emissions. (The IACC)	locating the Site Campus on-site and use of a Park and Ride and Logistics Centre. These elements of the Wylfa Newydd Project and the embedded mitigation are discussed in more detail in chapters A2 (project overview and introduction to the developments) (Application Reference Number: 6.1.2), D1 Proposed development (Application Reference Number: 6.4.1) and C2 (Application Reference Number: 6.3.2).
Mitigation – combustion plant Plant emission standards should be introduced to reduce the impact as far as possible. (The IACC)	The use of emission standards based on the European Directive (EC Directive 97/68/EC) for non-road mobile machinery operating on the Wylfa Newydd Development Area has been included in the assessment. See chapter D5 (Application Reference Number: 6.4.5).
Monitoring Whilst the project-specific NO_2 diffusion tube survey will be useful and help clarify the baseline air quality, it is not considered that this approach is sufficient for a project of this size. It is not clear whether any diffusion tubes have been located with a reference method chemiluminescent analyser so that a project-specific bias adjustment factor can be developed. A dust and particulate monitoring survey could be established so that baseline concentrations and deposition rates can be quantified and compared to concentrations and deposition rates during the construction phase. (The IACC and Welsh Government)	The NO_2 survey was discussed and agreed with the IACC prior to commencement and measured concentrations were bias adjusted using the same method as used by the IACC for LAQM. Co-locating a diffusion tube with a chemiluminescent analyser was not considered appropriate as the closest analyser was a roadside location in Wrexham, approximately 100km to the southeast of the Power Station Site. Dust and particulate monitoring surveys undertaken by the IACC were used to establish the baseline. Details of the review of baseline air quality, including all monitoring data, are included in appendix B5-1 (Application Reference Number: 6.2.18). This was issued to the IACC and NRW during the consultation process.

Key issue raised	Action taken
Contaminated soils Risks from dusts arising from contaminated soils need to be considered in full. (The IACC)	This is addressed in chapter D7 (soils and geology) (Application Reference Number: 6.4.7), which includes a description of the required mitigation measures.

Pre-Application Consultation Stage Three

5.3.6 Table B5-7 outlines how key issues raised during Pre-Application Consultation Stage Three have been considered in the assessment.

Table B5-7 Key issues raised during Pre-Application Consultation Stage Three

Key issue raised	Action taken
Concerns were raised regarding potential increases in $PM_{2.5}$ concentrations and the use of the annual mean air quality objective of 25µg/m^3 as the assessment criteria. The IACC referred to the latest Welsh Government Local Air Quality Management Policy Guidance [RD8], which refers to the World Health Organization air quality guideline value of 10µg/m^3 and that there is little evidence that there is a threshold below which no adverse health effects would be anticipated. (The IACC)	This continues to be the subject of further consideration with the IACC. The proposed good practice mitigation is intended to reduce the increases in particulate concentrations, including $PM_{2.5}$, to as low a level as is reasonably practicable, which accords with the policy guidance referred to by the IACC [RD8]. This would include continuous monitoring and the setting of appropriate alert thresholds and mechanisms for identifying areas or activities emitting particulates and taking further action to prevent or reduce emissions. The provision for the monitoring and feedback mechanisms are set out in the air quality management strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Main Power Station Site sub-CoCP (Application Reference Number: 8.7) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12).
Concerns were raised regarding the effects of dust emissions from the construction phase.	The Environmental Statement has assessed the impacts of dust associated with the construction and decommissioning phases in chapters C4 (Application Reference

Key issue raised	Action taken
(The IACC, NRW and the Woodland Trust)	Number: 6.3.4), D5 (Application Reference Number: 6.4.5), E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5). Appropriate mitigation has been proposed in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and sub-CoCPs (Application Reference Numbers: 8.7 to 8.12) to prevent and control the emissions of dust.
A concern was raised in relation to the location of the A5025 Off-line Highway Improvements relative to nearby properties and the potential air quality effects during operation of the A5025 Off-line Highway Improvements. (Other consultee)	The assessment of the operation of the A5025 Off-line Highway Improvements considers the potential air quality effects on all nearby properties (see chapter C4, Application Reference Number: 6.3.4).
A concern was raised in relation to the proposed use of the Logistics Centre at Parc Cybi with regard to air pollution at Holyhead and Valley. (Other consultees)	The assessment of the project-wide road traffic emissions has been included in the Environmental Statement including effects around Parc Cybi and Valley (see chapter C4, Application Reference Number: 6.3.4). The construction of the Logistics Centre is assessed in chapter H5 (Application Reference Number: 6.8.5).

Consultation on Additional Land

5.3.7 In February 2018, Horizon undertook consultation on additional land that had not been consulted on previously. The additional land was required to:

- accommodate proposals to create or enhance wetland sites across Anglesey as Ecological Compensation Sites;
- create two new ecological mitigation areas, and minor changes to the connection to the national grid at the Wylfa Newydd Development Area; and
- update the order limits for the A5025 Off-Line Highway Improvements, and minor refinements to the boundaries of the Off-Site Power Station Facilities and Logistics Centre.

5.3.8 The feedback from the consultation has been reviewed and the following points were raised with respect to the wetland creation sites:

- the IACC noted that the potential effects of transporting the spoil off-site needs consideration with respect to air quality emissions;
- NRW stated that the Environmental Statement and Shadow Habitats Regulations Assessment will need to consider the reasonable worst-case scenario in relation to topsoil export and traffic movements for assessment purposes. Horizon will need to demonstrate whether the increased traffic will exceed the threshold and require assessment of protected sites within the 200m screening distance as required under the Design Manual for Roads and Bridges (DMRB).

Air quality assessments are provided in appendix D1-2 (Ecological Compensation Sites: Assessment of Environmental Effects) (Application Reference Number: 6.4.18) for each of the Ecological Compensation Sites.

Non-statutory consultation

Environmental Impact Assessment Progress Report

5.3.9 An EIA Progress Report was provided to the IACC and NRW in 2016 with updated information on the design development and associated environmental assessment. Table B5-8 outlines how key issues raised in feedback from these stakeholders have been considered in the assessment.

Table B5-8 Key issues raised in response to the EIA Progress Report

Key issue raised	Action taken
The minimum of the critical load range should be used when there is uncertainty. (NRW)	A technical note was issued to NRW and the IACC setting out the ecological receptors and the critical loads at each ecological receptor to be used in the assessment. The minimum of the critical load range for nitrogen deposition was used for each ecological receptor. See appendix B5-2 (Existing Nitrogen and Acid Deposition and Critical Loads at Ecological Receptors for the Wylfa Newydd Project) (Application Reference Number: 6.2.19).
Clarify where the traffic emission factors in ADMS-Roads are coming from. (NRW)	A description of the methodology for dispersion modelling of road traffic emissions using ADMS-Roads is provided in this chapter, chapter C4 (Application Reference Number: 6.3.4) and appendix C4-1 (Project-Wide Modelling of Road Traffic

Key issue raised	Action taken
	Emissions) (Application Reference Number: 6.3.27)[1].
Is the demolition of existing buildings included in the assessment of emissions from construction plant and machinery? (NRW)	Emissions from plant and machinery used to demolish existing buildings are included in the assessment. Emissions of dust from the demolition of existing buildings and pollutants from the related construction plant and machinery are also included in the assessment. See chapter D5 (Application Reference Number: 6.4.5) and appendices D5-1 (Construction Dust Assessment – Main Construction) (Application Reference Number: 6.4.20) and D5-2 (Application Reference Number: 6.4.21).
Include 1.5km resolution Numerical Weather Prediction (NWP) data and incorporating the topography into the model. (NRW)	The 1.5km resolution NWP data (2013-2016) have been utilised in the dispersion modelling assessments presented in chapters C4 (Application Reference Number: 6.3.4) and D5 (Application Reference Number: 6.4.5) (together with lower resolution data for 2007 to 2012). Topography of the Wylfa Newydd Development Area, and surrounding areas, during Main Construction and operation of the Power Station were incorporated into the models (see appendix D5-2, Application Reference Number: 6.4.21, and appendix D5-3, Application Reference Number: 6.4.22).
How was the topography represented in terms of modelling? (NRW)	Terrain was included in the model using Ordnance Survey (OS) Landform Panorama Digital Terrain data as well as a finer resolution terrain file for the Wylfa Newydd

[1] The ADMS dispersion modelling software is developed in the UK by Cambridge Environmental Research. ADMS is used extensively throughout the UK and is accepted as an appropriate air quality modelling tool by regulatory bodies and Local Planning Authorities. More information is available at http://www.cerc.co.uk/environmental-software.html.

Key issue raised	Action taken
	Development Area at different phases during Main Construction and operation as described further in appendix D5-2 (Application Reference Number: 6.4.21) and appendix D5-3 (Application Reference Number: 6.4.22).
Is the magnitude of air quality effects associated with the decommissioning activities less than that associated with the construction activities for both long-term and short-term air quality effects? (NRW)	It has been assumed that the assessment of effects for decommissioning would be the same or less than during the construction phase for both long- and short-term air quality effects, as discussed in chapters C4 (Application Reference Number: 6.3.4), D5 (Application Reference Number: 6.4.5), E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5).
Information should be provided to demonstrate how effective dust mitigation measures are for key ecological receptors. (NRW)	A construction dust assessment has been carried out for Main Construction following the methodology set out the in IAQM guidance [RD12]. As part of this methodology, appropriate mitigation measures have been identified. The construction dust assessment relevant to key ecological receptors such as Tre'r Gof SSSI and Cae Gwyn SSSI is provided in appendix D5-1 (Application Reference Number: 6.4.20) and provides details of the dust mitigation measures and proposed monitoring.
Provide details of the probability assessment for the risk of exceedance of the short-term AQO. (NRW)	Further details of these calculations are provided in the assessment of emissions from the combustion plant during operation of the Power Station (see appendix D5-3, Application Reference Number: 6.4.22).

Draft Environmental Statement

5.3.10 During September 2017, draft Environmental Statement chapters were provided to the statutory and key non-statutory stakeholders. Table B5-9 outlines key issues raised and how these have been addressed within the Environmental Statement.

Table B5-9 Key issues raised in response to the Draft Environmental Statement

Key issue raised	Action taken
Further detailed consideration of the effects of road traffic emissions on Malltraeth Marsh SSSI, Beddmanarch-Cymyran SSSI and Coedydd Afon Menai SSSI was requested. (NRW)	Where required, more detailed assessment was undertaken as requested. The assessment is set out in chapter C4 (Application Reference Number: 6.3.4) and appendix C4-2 (Assessment of Road Traffic Emissions – Mainland Wales) (Application Reference Number: 6.3.28).
Monitoring of dust deposition at Cae Gwyn SSSI and Tre'r Gof SSSI during Main Construction was advised. (NRW)	Noted, dust deposition monitoring at these sites is proposed as part of the mitigation set out in the Main Power Station Site CoCP (Application Reference Number: 8.7).
Specific queries in relation to the dispersion modelling of emissions from construction plant, machinery and marine vessel emissions and emissions from the operational combustion plant including queries relating to sensitivity analysis and clarification of emissions data and limits. (NRW)	Full details of the dispersion modelling of emissions from construction plant, machinery and marine vessel emissions and emissions from the operational combustion plant are provided in appendix D5-2 (Application Reference Number: 6.4.21) and appendix D5-3 (Application Reference Number: 6.4.22).
Incorporation of the policies set out in the Local Air Quality Management in Wales policy guidance [RD8], including the reference to the World Health Organization air quality guideline value of 10µg/m^3 for $PM_{2.5}$ within the guidance. (The IACC)	The principles of the policy guidance [RD8] have been taken into consideration within the air quality assessment. This chapter acknowledges that the national AQOs are not 'safe' levels of air pollution and that air quality just compliant with the AQOs carries health risks. It also acknowledges that NO_2 and particulates ($PM_{2.5}$ and PM_{10}) currently have no safe threshold defined and the lower concentration of these pollutants the lower the risks of adverse health

Key issue raised	Action taken
	effects. It is noted that this policy guidance does not stipulate the use of the WHO air quality guideline value of 10µg/m^3 for $PM_{2.5}$ and states "*while compliance with the national air quality objectives is essential, it is desirable to keep levels of pollution as low as reasonable practicable.*" The quantitative assessment of $PM_{2.5}$ has been undertaken based on the AQO of 25ug/m^3 (see paragraph 5.4.135). However, the proposed good practice mitigation is intended to reduce any temporary increases in particulate concentrations from construction activities, including $PM_{2.5}$, to as low a level as is reasonably practicable, which accords with the policy guidance. This will be managed through the setting of appropriate monitoring thresholds, response mechanisms and ongoing compliance tracking and reporting, as set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and Main Power Station Site sub-CoCP (Application Reference Number: 8.7). The potential for health effects due to increases in NO_2 and particulate ($PM_{2.5}$ and PM_{10}) concentrations, which takes into account the non-threshold effects of these pollutants, is assessed as part of the Health Impact Assessment Report (Application Reference Number: 8.19).
Recommendation to adopt the World Health Organization air quality guideline value of 10µg/m^3 for $PM_{2.5}$ due to the potential for increases of this pollutant to lead to health effects (The IACC)	See above response.
Ensuring the residents of the Site Campus are considered within the air quality assessment.	The Site Campus is recognised as a relevant receptor and included within the air quality assessment of dust, odour and air pollutants (see chapter

Key issue raised	Action taken
(The IACC)	D5, Application Reference Number: 6.4.5). The Site Campus residents are also considered within the Health Impact Assessment Report (Application Reference Number: 8.19).
Agreeing an appropriate threshold for dust soiling based on a specified increment above the existing background deposition rates. (The IACC)	This has been discussed with the IACC during stakeholder consultation and the proposed thresholds for monitoring dust deposition are set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6).
The potential effects of dust deposition on sensitive vegetation and features of Cemlyn Bay SSSI/SAC and the proposed mitigation measures. (National Trust)	The assessment of dust deposition at Cemlyn Bay SSSI/SAC is presented in chapter D5 (Application Reference Number: 6.4.5) and appendix D5-1 (Application Reference Number: 6.4.20).
The potential effects of NOx and nitrogen and acid deposition on Cestyll Garden (Registered Historic Park and Garden Grade II). (National Trust)	The predicted concentrations of pollutants and deposition rates of nitrogen and acid at Cestyll Gardens are contained in chapter D5 (Application Reference Number: 6.4.5). The assessment of effects in relation to NOx and nitrogen and acid deposition for the submission of the DCO would be contained in chapter D11 (cultural heritage) (Application Reference Number: 6.4.11).

Topic-specific stakeholder engagement

5.3.11 In addition to the three formal stages of consultation above, topic-specific consultation has been undertaken with relevant stakeholders. Table B5-10 summarises the details of the consultation that has taken place with respect to the air quality assessment.

[This page is intentionally blank]

Table B5-10 Summary of topic-specific consultation

Date	Stakeholder	Title and format	Issues arising	Action taken
24 November 2014	The IACC and NRW	Air quality meeting	Meeting to discuss the air quality modelling and assessment methodologies.	A draft document setting out the preferred approach to the modelling and assessment of emissions to air encompassing the Wylfa Newydd Development Area, construction and operation of the Wylfa Newydd Project was circulated prior to the meeting. The document was discussed in detail at the meeting, and the IACC and NRW were given the opportunity to contribute written comments, after which the document was finalised and issued.
February 2015	The IACC	Written communications	Request for LAQM information produced by the IACC.	Information provided by the IACC.
March 2015 to June 2015	The IACC and NRW	Written communications	Discussions with the IACC and NRW relating to the air quality assessment methodology report [RD16].	The methodology report was updated and re-submitted to the IACC and NRW. No further comments were received. This report was then updated, see May 2017 entry.

Date	Stakeholder	Title and format	Issues arising	Action taken
August 2015	The IACC	Written communications	Request for LAQM information produced by the IACC.	Information provided by the IACC.
21 September 2015	National Trust	Wylfa Newydd EIA key disciplines meeting with National Trust	Meeting to provide National Trust with an overview of the EIA work being undertaken as part of the Wylfa Newydd Project.	Particular focus was on the EIA topics which may be relevant in assessing the effects taking into account National Trust land.
December 2015	The IACC	Written communications	Request for LAQM information produced by the IACC.	Information provided by the IACC.
26 January 2016	NRW	Air quality (EIA Progress Report modelling review) meeting	Meeting to discuss the interim combustion plant air dispersion modelling report issued to NRW prior to the submission of the EIA Progress Report.	Comments made by NRW on the modelling report were considered and included in the modelling for the DCO Environmental Statement where relevant.
January and February 2016	The IACC	Written communications and site visit on 9 February 2016	Confirm the set up and commencement of the supplementary NO_2 diffusion tube monitoring survey undertaken by the IACC.	Specific monitoring locations were discussed and agreed with the IACC prior to the NO_2 diffusion tube deployment and commencement of the survey on 9 February 2016.
April 2016	The IACC	Written communications	Clarification of LAQM information.	Information provided by the IACC.

Date	Stakeholder	Title and format	Issues arising	Action taken
13 June 2016	The IACC	Meeting with the IACC. Meeting to provide an overview of the EIA work being undertaken as part of the Wylfa Newydd Project.	Meeting with the Environmental Health Officer (Sustainable Development Department) on the EIA Progress Report and the Pre-Application Consultation Stage Two. The meeting included discussions on the air quality assessment work being undertaken for the DCO Environmental Statement and specific aspects that were being included within the assessment based on previous consultation. Specific discussions were held on the supplementary NO_2 diffusion tube monitoring survey and the monitoring which would be included as part of the air quality management strategy within the Main Power Station Site sub-CoCP (Application Reference Number: 8.7) for the control of dust and air	Following the meeting, the comments from the IACC were considered and included in this assessment methodology where relevant.

Date	Stakeholder	Title and format	Issues arising	Action taken
			pollution during Main Construction.	
21 July 2016 and 01 August 2016	The IACC	Verbal and written communications	Discussions with Environmental Health Officer (Sustainable Development Department) on the proposed monitoring of dust and air pollution during the Site Preparation and Clearance works (also relevant for Main Construction). Discussions were also held on the topic of the potential increase in NO_2 concentrations close to the monitoring location at the lay-by on the A55 at Llanfair Pwllgwyngyll due to the Wylfa Newydd Project road traffic, and the inclusion of this location within the air quality assessment.	A meeting note was submitted to the IACC to record the conversation and was used to inform the air quality monitoring proposed as mitigation in this Environmental Statement. The location at the lay-by on the A55 at Llanfairpwll was included as a receptor within the air quality assessment (see chapter C4, Application Reference Number: 6.3.4).
September 2016	The IACC	Written communications	Request for LAQM information, including results of air quality monitoring, produced by the IACC.	Information provided by the IACC.

Date	Stakeholder	Title and format	Issues arising	Action taken
September to May 2017	NRW	Report title: Existing Nitrogen and Acid Deposition and Critical Loads at Ecological Receptors for the Wylfa Newydd Development Area [RD17]. Written communications and teleconference meeting to discuss critical loads.	Discussion on the selection of critical loads to be used in the assessment of the deposition of nitrogen and acid at ecological receptors.	Following the submission of the report, and comments received by NRW, this report was re-submitted for approval by NRW.
December 2016	NRW, the IACC, GC, CCBC, DCC and FCC	Report title: Extent of Study Area and Receptor Selection for the Assessment of Air Quality [RD18]	A report setting out the study area and approach to the selection of receptor locations was submitted to the stakeholders.	The report and content was accepted by all stakeholders without further amendment. An updated was issued to the stakeholders in July 2017 [RD19].
January to May 2017	NRW	Report title: Sulphur Dioxide and Ozone Concentrations in the Vicinity of the Wylfa Newydd Development Area [RD20]. Written communications and teleconference meeting to discuss the 24-hour mean NOx critical level.	Discussion on the appropriate critical level to be used in the assessment of 24-hour mean NOx concentrations at ecological receptors.	It was agreed that a critical level of 200µg/m^3 was appropriate for 24-hour mean NOx concentrations where lichens and bryophytes are not present.

Date	Stakeholder	Title and format	Issues arising	Action taken
April 2017	The IACC	Verbal communications	Discussions with the Environmental Health Officer (Sustainable Development Department) to discuss the Wylfa Newydd Project and the approach to assessment of the road traffic noise and air quality effects.	No further actions were required.
May 2017	The IACC and NRW	Report title: Wylfa Newydd Project, Consultancy Report: Baseline Data Synopsis Report – Air Quality (appendix B5-1, Application Reference Number: 6.2.18)	The report setting out the revised air quality baseline study and approach to the determination of background concentrations for the air quality assessment was submitted to the stakeholders. The IACC accepted the report with no comment. NRW provided some review comments.	The report was updated to take account of the NRW review comments where appropriate.
May 2017	The IACC and NRW	Report title: Air Quality Modelling and Assessment Methodology – Non-Radiological Emissions, Wylfa Newydd Project [RD16]	The report setting out the revised air quality modelling and assessment methodologies for the air quality assessment was submitted to the stakeholders. The IACC	The report was updated to take account of the review comments where appropriate.

Date	Stakeholder	Title and format	Issues arising	Action taken
			and NRW provided some review comments on the report.	
June 2017	The IACC and NRW	Report title: Existing Nitrogen and Acid Deposition and Critical Loads at Ecological Receptors for the Wylfa Newydd Project (appendix B5-2, Application Reference Number: 6.2.19). Written communications	The report setting out the revised existing deposition and proposed critical loads for the air quality assessment was submitted to the stakeholders.	No further actions were required.
11 July 2017	The IACC and NRW	Meeting to discuss baseline air quality report (appendix B5-1, Application Reference Number: 6.2.18), and air quality modelling and assessment methodology report [RD16]. Review and discuss the modelling and assessment results.	The following key issues arose: • short term exposure locations adjacent to A55; • the cumulative effect of committed and future developments; • air quality effects from construction plant, machinery and marine vessel emissions; and • further consultation planned to discuss	Several actions from the meeting remain open including further consultation required on the proposals for mitigation particularly in relation to monitoring during Main Construction.

Date	Stakeholder	Title and format	Issues arising	Action taken
			mitigation and the air quality management strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and sub-CoCPs (Application Reference Numbers: 8.7 to 8.12).	
16 November 2017	The IACC	Meeting to review latest air quality assessment and discuss proposals for mitigation and monitoring.	The following key issues arose: • short term exposure locations adjacent to the A55 and the potential for monitoring to be undertaken to determine peak short-term NO_2 concentrations due to road traffic emissions; • development of air quality and dust monitoring and the setting of alert trigger levels for the construction at the Wylfa Newydd Development Area, particularly in relation to controlling	The proposals for monitoring and mitigation were developed further by Horizon to inform a further consultation meeting in January 2018, particularly in relation to monitoring and control of PM_{10} and $PM_{2.5}$.

Date	Stakeholder	Title and format	Issues arising	Action taken
			concentrations of particulates (PM_{10} and $PM_{2.5}$); • the location of the standby generator at the Off-Site Power Station Facility	
11 January 2018	The IACC	Meeting to discuss dust deposition and particulate monitoring thresholds, key receptor locations adjacent to the A55 and dispersion modelling of road traffic emissions for the Wylfa Newydd Project and the National Grid North Wales Connection project (AN07 North Wales Connection Project).	• Agreement on the principals for setting dust and PM_{10} monitoring alert trigger levels; • Agreement on the monitoring systems and techniques; • Consistency of input data and modelling of road traffic emissions between projects; and • Concerns relating to elevated NO_2 concentrations at layby locations adjacent to the A55 and need for further assessment and monitoring.	Provide suggestions to the IACC for the continuation of the NO2 diffusion tube survey which has been in place since February 2016. Further liaison with National Grid regarding air quality assessments. Review one year NO_2 monitoring dataset in May 2018 with the IACC, GC and National Grid. Use review to determine scope of further assessment and requirement for mitigation.

[This page is intentionally blank]

5.4 Topic-specific methodologies and assessment criteria

Introduction

5.4.1 The overarching approach to the EIA, including the approach to the assessment of cumulative effects, is provided in chapter B1 (Application Reference Number: 6.2.1). This section outlines the specific methodology used to assess the effects of the Wylfa Newydd Project on air quality. It outlines the methods and criteria used to:

- define the study area and identify topic receptors;
- establish the environmental baseline for topic receptors; and
- determine the value/sensitivity of receptors, the magnitude of change and significance of effect.

5.4.2 An overview of the air quality modelling and assessment methodology was described in the *Air Quality Modelling and Assessment Methodology – Non-Radiological Emissions* report [RD16], which was submitted to the IACC and NRW for agreement. This described in outline how the study areas would be defined, the selection of receptors, the specific assessment and modelling methodologies, including relevant technical aspects, and also the assessment criteria and determination of significance. These aspects are discussed in detail in the following sections.

Assessment of parameters

5.4.3 As outlined in chapter B1 (Application Reference Number: 6.2.1), the approach adopted for the design of the WNDA Development, Off-Site Power Station Facilities and Associated Development is to set parameters, where necessary, for the extent of the development and key aspects of that development. The final design and construction methodology would be limited to these parameters and limits of deviation. As these parameters and limits of deviation vary between the various developments in the Wylfa Newydd Project they are considered on a site specific basis in chapter 5 within volumes D (Application Reference Number: 6.4.5), E (Application Reference Number: 6.5.5), F (Application Reference Number: 6.6.5), G (Application Reference Number: 6.7.5) and H (Application Reference Number: 6.8.5). Where relevant, the approach adopted in the assessments was to assess the worst-case within the parameters defined for WNDA Development, Off-Site Power Station Facilities and Associated Development, as described in each of the chapters referred to above.

Receptor types

5.4.4 Consideration must be given to the potential air quality and dust effects on the human populations of communities, and terrestrial and freshwater habitats and ecosystems which are near to the emission sources set out in paragraphs 5.1.3 to 5.1.5. For human exposure, sensitive receptors (termed ‘human

receptors') include residential properties, schools, care homes, recreational areas and Public Rights of Way including footpaths.

5.4.5 For habitats and ecosystems, the sensitive receptors (termed 'ecological receptors') include the following:

- SACs and SPAs, which are protected at a European level under the EU Habitats and Birds Directives respectively, collectively referred to as Natura 2000 sites;
- candidate SACs;
- Ramsar sites, comprising wetlands of international importance;
- SSSIs, which are protected by national legislation; and
- Local Wildlife Sites (referred to as Wildlife Sites) and Ancient Woodlands.

5.4.6 No other sites, such as National Nature Reserves or Local Nature Reserves were identified within the study areas.

Identification of study areas

5.4.7 As described previously in this chapter, there are a number of different types of potential air quality effects or emission sources that require assessment, as well as different locations to consider. As a result, the air quality study area cannot be defined within a fixed boundary for all activities, but would necessarily vary between the different activities.

5.4.8 The different study areas are discussed below for the following air quality effects:

- emissions of dust;
- emissions of odour;
- construction plant, machinery and marine vessel emissions;
- road traffic emissions during the construction and operation phase; and
- combustion plant emissions during the operation phase.

Emissions of dust

5.4.9 For dust emissions, the assessment at human receptors focuses on areas extending up to 350m from the Wylfa Newydd Development Area, Off-Site Power Station Facilities or Associated Development site boundaries. This distance is based on IAQM guidance for identifying when an assessment of dust effect is required [RD12]. Potential effects at distances greater than 350m are likely to be less than those at locations closer to the Wylfa Newydd Development Area, Off-Site Power Station Facilities or Associated Development site, and any mitigation measures applied to protect sensitive receptors within 350m would help to reduce any possible effects beyond 350m. The effects of "trackout" (construction related vehicles moving on and around the construction area emitting exhaust particulate matter and re-suspending loose material on the road) also need to be determined up to 50m from the edge of the local access roads within 500m of the respective site

entrances. In line with the IAQM guidance, the assessment also considers ecological receptors up to 50m from the respective site boundaries.

Emissions of odour

5.4.10 The risk of potential releases of odorous substances is based on a qualitative assessment which focuses on the likely scale of effects, and the mitigation measures to prevent the odour emissions at the source. In the IAQM guidance [RD12], receptors are defined as users of adjacent land. Therefore, the study area for the assessment of emissions of odours is limited to the closest adjacent land users.

Emissions from construction plant, machinery and marine vessels

5.4.11 For emissions from construction plant, machinery and marine vessels, the assessment for human and ecological receptors focuses on areas up to 2km from the Wylfa Newydd Development Area. This 2km study area encompasses an area where the highest potential effects may occur due to emissions to air from the modelled sources, which have relatively low release heights.

5.4.12 Although not directly applicable, the study area for ecological receptors for the assessment of emissions from construction plant, machinery and marine vessels is informed by the air emissions risk assessment guidance produced by the Environment Agency and adopted by NRW [RD14]. The study area includes specific ecological receptors representing European Designated Sites (SACs, SPAs and Ramsar sites) up to 15km from the Wylfa Newydd Development Area. A study area of 2km was specified for all other ecological receptors, including SSSIs, Ancient Woodlands and Wildlife Sites.

Emissions from road traffic

5.4.13 The study area for the assessment of emissions from road traffic is based on identifying where the Wylfa Newydd Project would lead to a change in traffic flows on the road network which exceeds the relevant thresholds set out in the EPUK/IAQM guidance [RD11], as follows:

- the annual average daily traffic (AADT) flow in vehicles per day of cars and light goods vehicles (collectively known as light goods vehicles (LGVs)) would change by 500 or more; or
- HGV flow including buses (collectively known as HGVs) would change by 100 AADT or more.

5.4.14 Road links on the Isle of Anglesey and on mainland Wales where the change in traffic flows exceed these thresholds are considered to be ‘affected’ roads. A detailed assessment has been undertaken to determine the potential air quality effects at receptors within 200m of these affected roads. Roads that experience a change in traffic flows below these thresholds do not require further assessment, as the change in concentrations of pollutants at receptors close to these roads would be imperceptible.

Emissions from combustion plant

5.4.15 The study areas for human and ecological receptors for the assessment of combustion plant emissions during operation of the Power Station is the same as that set out for emissions from construction plant, machinery and marine vessels.

Identification of receptors

Human receptors

5.4.16 Human receptors include locations where members of the public could be present over short or long periods, for example residential properties, schools, hospitals, doctors' surgeries, places of worship, busy streets, shops, playing fields or parks and Public Rights of Way including footpaths.

5.4.17 For the assessment of emissions of dust, a receptor count has been carried out for sensitive receptors within 350m of the Wylfa Newydd Development Area, Off-Site Power Station Facilities and Associated Development boundaries. These receptors have been identified from the OS AddressBase Plus dataset [RD21], OS mapping and Wylfa Newydd Project design information.

5.4.18 For emissions from the construction plant, machinery and marine vessels and operational combustion plant for the Power Station, all relevant human receptor locations (short-term and long-term) within 2km of the Wylfa Newydd Development Area were specified to identify the greatest potential air quality effects, including receptors representing the on-site Temporary Workers' Accommodation (construction plant, machinery and marine vessels only). Short-term human receptors include all long-term receptors and additional receptors along footpaths at regular spacing of approximately 100m (existing and proposed diversions), recreational areas and receptors representing nearby workplaces, including the adjacent Existing Power Station. These receptors have been identified from the OS AddressBase Plus dataset [RD21], OS mapping and Wylfa Newydd Project design information.

5.4.19 For the project-wide air quality effects of traffic, the study area also encompasses numerous villages, individual properties and other sensitive locations across Anglesey and mainland Wales which are within 200m of the affected roads (as discussed previously in paragraphs 5.4.13 and 5.4.14). On the Isle of Anglesey, all relevant human receptors that are within 200m of the affected roads have been identified from the OS AddressBase Plus dataset [RD21]. The façade of each property was selected as the assessment location for these receptors. In addition, short-term receptor locations such as the closest gardens and lay-bys to the affected roads have also been included in the assessment.

5.4.20 For the assessment of emissions from road traffic on mainland Wales, a number of key human receptor locations representing the closest properties, which could experience the largest change in pollutant concentrations, were identified and assessed.

Ecological receptors

5.4.21 The assessment of emissions from the construction plant, machinery and marine vessel and operational combustion plant considers the European designated ecological receptors (SACs, SPAs and Ramsar sites) up to 15km from the Wylfa Newydd Development Area. Other ecological receptors (SSSIs, Wildlife Sites and Ancient Woodland) within 2km of the Wylfa Newydd Development Area have been considered.

5.4.22 For the project-wide air quality effects of traffic emissions on the Isle of Anglesey, all ecological receptors within 200m of the affected roads were included in the assessment on the Isle of Anglesey. On mainland Wales, only European Designated Sites (e.g. SPAs and SACs) and SSSIs within 200m of the affected roads were assessed due to the lower risk of significant effects (i.e. lower changes in traffic flows than on the Isle of Anglesey and the less stringent criteria for Wildlife Sites and Ancient Woodlands).

5.4.23 The locations of the SPAs, SACs, Ramsar site, SSSIs and Ancient Woodlands were identified from OS data supplied by NRW [RD22]. The locations of the Wildlife Sites were obtained from the IACC [RD23].

Identification of baseline conditions

Characterisation of environmental baseline

5.4.24 Background air quality is a concept used to enable assessments of the effects of particular emissions sources, without the need for all sources in the area and beyond to be considered explicitly within the air quality model. Generally, the background concentration represents the ambient concentration of a particular pollutant that would exist in the absence of the emission source or sources being modelled. The modelled contribution from the assessed emission sources is added to the background concentration to provide the total concentration of the pollutant, which can then be compared to the relevant AQO.

5.4.25 The background air quality is generally the concentration considered to be due to emissions from several sources, including long-range or transboundary pollution from other regions or countries. It also includes a contribution due to emissions from natural sources such as particulates from sea spray or from wind blowing across land, and emissions from other nearby sources such as urban areas, roads or industry that are not included within the model.

5.4.26 The Wylfa Newydd Development Area, Off-Site Power Station Facilities and Associated Developments are located within the jurisdiction of the IACC. As part of the LAQM process, the IACC undertakes an annual review of air quality in its area to determine whether the AQOs for a number of key air pollutants will be achieved. This review is undertaken on an ongoing basis, and is reported annually to the Welsh Government.

5.4.27 As part of this review process, the IACC has undertaken measurements of a number of pollutants in recent years, including NO_2, PM_{10}, $PM_{2.5}$ and SO_2. The IACC has also carried out measurements of dust deposition. The IACC

has undertaken measurements of some pollutants (NO_2, PM_{10}, $PM_{2.5}$ and dust deposition) near the Wylfa Newydd Development Area and the A5025 and A55, in order to help inform its response to the Wylfa Newydd Project application for development consent.

5.4.28 To characterise the environmental baseline and identify the background concentrations for the air quality assessment, the air quality reports (produced by the IACC as part of the LAQM process) and data were obtained and reviewed. Data on the measurements undertaken by the IACC were used to define the approach to the determination of the background concentrations of each of the assessed pollutants.

5.4.29 To further characterise the environmental baseline, an air quality monitoring survey was initiated with the IACC in February 2016. This ongoing survey focuses on the key pollutant of NO_2, and comprises diffusion tube measurements at locations in the vicinity of the Wylfa Newydd Development Area, and adjacent to the road network which would experience increases in traffic flows as a result of the Wylfa Newydd Project. The IACC also undertook additional PM_{10}/$PM_{2.5}$ and dust deposition monitoring in 2016 close to the Wylfa Newydd Development Area. These data were used to inform the air quality assessment. The IACC previously carried out monitoring of these substances between 2012 and 2014 at other nearby locations. Full details of all relevant monitoring are provided in appendix B5-1 (Application Reference Number: 6.2.18).

5.4.30 Defra and the devolved administrations provide empirically derived background maps, which give estimates of background pollutant concentrations on a 1km by 1km grid square resolution across the UK, which were also used in the process of determining the background concentrations. These background maps represent the average concentration across the 1km by 1km square (i.e. the background map concentrations do not provide the concentrations at a specific location, for example adjacent to a road source). The data were obtained from the UK-AIR website [RD24]. The data for NOx, NO_2, PM_{10} and $PM_{2.5}$ were derived by Defra, using a base year of 2013 from which future years can be projected generally based on a decreasing trend. Maps are also available for SO_2 and CO, and these are based on maps with a base year of 2001. Where appropriate, a cross-check against the measured data was undertaken to understand how representative the background maps were for determining the background concentrations in the vicinity of the Wylfa Newydd Development Area, Off-Site Power Station Facilities and Associated Development sites. This is discussed in more detail in appendix B5-1 (Application Reference Number: 6.2.18). Although newer background map data derived for a base year of 2015 were released during the writing of this report [RD25], a comparison of the mapping data from both datasets shows that the 2013 base year background mapping data generally provides higher background concentrations in the study areas. Therefore, the use of the 2013 background mapping data for NOx, NO_2 and $PM_{2.5}$ (PM_{10} background concentrations were based solely on monitoring) is likely to be conservative in most cases and would not affect the outcome of the assessment. The exception is for modelling emissions of road traffic where a lower background

concentration may increase the adjustment factor for the modelled road contribution. However, the differences in background concentrations are unlikely to alter the adjustment factor (and hence the change in concentrations due to the Wylfa Newydd Project traffic) sufficiently to alter the conclusions of the assessment.

5.4.31 It was concluded that the data available from the measurements and data sources mentioned above were considered to be sufficient to identify the baseline conditions, determine the background concentrations and undertake a robust assessment of air quality.

5.4.32 Further information on the methods and data sources used to characterise the baseline environment, and to determine the background concentrations of pollutants to be used in the assessment is provided in appendix B5-1 (Application Reference Number: 6.2.18).

5.4.33 The general background concentrations identified in appendix B5-1 (Application Reference Number: 6.2.18) would be representative of the concentrations at receptors located within the study areas that are further than 200m from the modelled road network.

5.4.34 To take account of the elevated concentrations at receptors within 200m of the modelled road network baseline, such as the A5025, road traffic emissions (i.e. without the Wylfa Newydd Project traffic) were modelled to determine a representative total baseline concentration of pollutants at each receptor. These baseline concentrations were used:

- for the assessment of emissions from construction plant, machinery and marine vessels;
- for the assessment of operational combustion plant emissions; and
- as the baseline concentration for the construction dust assessments.

Air quality review

5.4.35 This section provides a brief overview of the baseline conditions on Anglesey and mainland Wales relevant to the assessments set out in chapters C4 (Application Reference Number: 6.3.4), D5 (Application Reference Number: 6.4.5), E5 (Application Reference Number: 6.5.5), F5 (Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5).

5.4.36 The review of baseline conditions indicated that the existing background air quality in the vicinity of the Wylfa Newydd Development Area, Off-Site Power Station Facilities, the Associated Developments and affected roads appears to be good, and concentrations of air pollutants are generally well within the relevant AQOs. Although concentrations of NO_2 are elevated in very close proximity to the A55, The IACC has concluded that concentrations of air pollutants at locations representative of relevant long-term exposure locations, such as residential properties, are well within the annual mean AQO. The IACC has not declared any Air Quality Management Areas and no detailed assessments are currently required as part of the LAQM process.

5.4.37 Dust deposition measurements recorded in the vicinity of the Wylfa Newydd Development Area are representative of the relatively low levels found in rural, open country locations, and these would be broadly representative of the dust deposition in most rural locations on Anglesey which are not close to specific sources of dust.

5.4.38 Beyond Anglesey, air quality measurements undertaken by GC, CCBC, DCC and FCC also indicate that concentrations of the measured pollutants (NO_2 and PM_{10}) are currently within the relevant AQOs close to the main road network. Similar to the IACC, the relevant mainland Wales councils have not declared any Air Quality Management Areas, and no detailed assessments are currently required as part of the LAQM process.

Evolution of baseline

5.4.39 Some of the assessments are based on modelling future year scenarios, so it is important to understand how the current baseline air quality conditions may change over time. This can then be incorporated into the assessment so that baseline conditions are not underestimated in the future year assessments.

5.4.40 An analysis of the long-term trend in air quality for the UK is provided in appendix B5-1 (Application Reference Number: 6.2.18). The analysis showed that, generally, ambient concentrations of the assessed pollutants (NO_2, SO_2, CO and PM_{10}) have decreased substantially over the last 20 years. The decreasing trends are levelling off at these current low levels, and are unlikely to decrease significantly in future. The exception is NO_2, for which concentrations at some busy roadside locations have remained relatively constant between the late 1990s and 2010 [RD26] [RD27]. There has been some decrease in concentrations at many roadside sites observed since 2010, but it is not known if this is a short-term variation or part of a longer-term decreasing trend.

5.4.41 For $PM_{2.5}$, there is a much smaller dataset and measurements from 2009 to 2016 show that there has been a decrease in $PM_{2.5}$ concentrations at the majority of urban background monitoring locations, despite overall emissions of $PM_{2.5}$ remaining relatively constant over the same period [RD26] [RD27]. The dataset is too small to identify any longer-term trends.

5.4.42 Analysis of the NO_2 data recorded by the IACC shows that measurements close to the A55 have not shown a significant positive or negative trend since 2001 (see appendix B5-1, Application Reference Number: 6.2.18). However, since 2010, the NO_2 concentrations have shown a general decline, with the latest measurements being the lowest since 2001. This could be due to decreases in traffic flows on the A55, which have been decreasing since 2007 (see appendix B5-1, Application Reference Number: 6.2.18) [RD28]. This is similar to the roadside measurements undertaken by GC close to the A55, although measurements recorded further from the A55 by GC or CCBC show no significant positive or negative trend since 2011.

5.4.43 No significant increasing or decreasing trend was observed on measurements of PM_{10} at Llangefni and this is similar to measurements recorded close to the A55 by CCBC.

5.4.44 There is little data available for determining the trend in air quality at rural locations, which represent the majority of the study areas. The concentrations in rural areas are generally well below the relevant AQOs (see appendix B5-1, Application Reference Number: 6.2.18). It is likely that concentrations of pollutants in rural areas would experience similar trends to those described above for future years, i.e. slightly decreasing or a flat trend.

5.4.45 As a conservative approach, it was assumed that the current baseline conditions determined from recent or historical data represent the baseline conditions in all future year assessment scenarios.

Other factors affecting baseline

5.4.46 The baseline air quality in the assessed study areas could be affected by other developments or other factors (which are not related to the Power Station or the Wylfa Newydd Project). These aspects are considered below.

Other developments

5.4.47 Other future developments which are not included within the baseline air quality may affect air quality in the vicinity of the Wylfa Newydd Project development sites or lead to increases in road traffic emissions on the road network. These have been incorporated into the assessment. For example, decommissioning of the Existing Power Station will lead to some changes in road traffic flows and could lead to emissions of dust and air pollutants at certain stages throughout the decommissioning process. These have been incorporated into the assessment of emission sources at the Wylfa Newydd Development Area during Main Construction (see chapter D5, Application Reference Number: 6.4.5, and appendix D5-2, Application Reference Number: 6.4.21) and the assessment of road traffic emissions (see chapter C4, Application Reference Number: 6.3.4). Other future committed developments have been included within the traffic flows used for the assessment of road traffic emissions. See chapter C2 (Application Reference Number: 6.3.2) and appendix C2-4 (DCO Transport Assessment) (Application Reference Number: 6.3.14) for a list of committed developments included in the traffic data and the basis behind the selection.

Traffic growth

5.4.48 Road traffic on the local road network, including the A5025 and A55, is considered likely to increase slightly over time, in common with most areas of the UK. However, any changes in traffic due to traffic growth are included within the traffic flow data used for the assessment of road traffic emissions.

Climate change

5.4.49 The 2007 report produced by the Air Quality Expert Group [RD29], indicated that the winter season may become windier with less stable weather conditions by the end of the century and summer seasons are anticipated to become hotter and sunnier, with an increase in stable weather conditions which lead to poor dispersion of air pollutants by the 2040s. The net effect of

these anticipated changes on the baseline air quality is difficult to establish, but is unlikely to significantly alter the baseline air quality to an extent that it would affect the outcome of this assessment. Other factors such as changes to technology and the move away from combusting fossil fuels driven by climate change mitigation are likely to lead to decreases in emissions of the key pollutants considered in this assessment.

Summary

5.4.50 The data obtained during the review of air quality have been used to define the baseline air quality within the study areas. The key points are summarised below.

- The method and data for characterising the baseline air quality conditions have been described. The method accounts for elevated concentrations at receptors within 200m of the road network to ensure background concentrations specified for each receptor are as robust as possible.
- Air quality on Anglesey and the areas considered in mainland Wales is generally good and concentrations of pollutants are below the relevant AQOs at locations representative of relevant long-term exposure locations. No Air Quality Management Areas have been declared by the IACC, GC, CCBC, DCC or FCC.
- It has been assumed that concentrations of pollutants would not decrease in future to provide a conservative approach.
- Other factors have been considered and are included within the assessment.

Technical methodology

5.4.51 Table B5-11 contains a summary of the proposed modelling and assessment techniques related to each particular source of emissions to air. The paragraphs within this section provide an outline description of the modelling and assessment techniques for each of the assessed emission source types.

5.4.52 In order to build the air quality models or undertake assessments, it is necessary to make certain assumptions regarding the precise nature and location of the sources, the dimensions and location of buildings or structures and other factors such as landforms. Where appropriate, the assumptions used to build the air quality models were based on representing a worst-case within the parameter based approach, with regard to the prediction of pollutant concentrations at nearby receptors. For example, stack heights for the operational combustion plant were set at their lowest height within the parameters, and setting of building heights, which affect dispersion from nearby stacks, at their maximum heights within the parameters. The adoption of a worst-case approach within the parameters, where relevant, is discussed in chapters C4 (Application Reference Number: 6.3.4), D5 (Application Reference Number: 6.4.5), E5 (Application Reference Number: 6.5.5), F5

(Application Reference Number: 6.6.5), G5 (Application Reference Number: 6.7.5) and H5 (Application Reference Number: 6.8.5).

Table B5-11 Modelling and assessment techniques for the various emission sources

Emission sources	Modelling/assessment technique
Dust emissions from activities undertaken during construction activities	Construction dust risk assessment using the methodology set out in the IAQM construction dust guidance [RD12] to define the risk of effects associated with a particular development proposal with regard to dust emissions. Once the risk of effect is determined, site-specific mitigation is developed to prevent dust emissions or reduce off-site effects to not significant.
Odour	The assessment of the releases of odorous substances based on a qualitative source-pathway-receptor assessment methodology set out in the IAQM odour guidance [RD15], focusing on the scale of the odorous emissions, distance to nearby sensitive areas or receptors, the prevailing weather conditions and the embedded or good practice mitigation which would prevent or reduce odour emissions at source.
Combustion emissions (i.e. NOx/NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$) from plant, vehicles and marine vessels operating within the Wylfa Newydd Development Area during Main Construction	Dispersion modelling using the ADMS dispersion modelling software. This is a detailed modelling approach used to calculate concentrations of pollutants at specific receptor locations, and across a large grid of receptors due to emissions to air from the modelled combustion sources. The modelled concentrations are combined with the background concentrations and compared to the relevant AQOs.
Combustion emissions (i.e. NOx/NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$) from standby electrical power generation plant and steam-raising boiler plant during operation of the Power Station	
Combustion emissions (i.e. NOx/NO_2, PM_{10} and $PM_{2.5}$) from road vehicles during the construction and operation phase	Dispersion modelling using the ADMS-Roads dispersion modelling software. This is a similar approach to that described for the ADMS modelling above, but uses a

Emission sources	Modelling/assessment technique
	software package that is specifically designed to model emissions to air from road traffic.

Emissions of dust

Introduction

5.4.53 Various activities on construction sites can give rise to emissions of dust that could cause annoyance to humans or harm to sensitive vegetation. This can be due to the soiling of surfaces, unless appropriate mitigation measures to prevent or reduce dust emissions are implemented. Dust emissions could also lead to increased short-term and long-term concentrations of PM_{10} and $PM_{2.5}$ in the vicinity of the Power Station, Off-Site Power Station Facilities and Associated Developments, which could potentially affect human health. Therefore, the effects of dust related to the construction phase or each development need to be addressed.

5.4.54 The temporary and varied nature of construction differentiates it from other dust sources for the estimation of emissions. This significantly reduces the efficacy of any quantitative modelling techniques to predict potential effects at receptor locations. On this basis, the assessment of dust during construction has been carried out using a risk-based appraisal, which takes into account the location of nearby sensitive locations in relation to the works associated with constructing the Power Station, Off-Site Power Station Facilities and Associated Developments, and the planned type and scale of the respective construction-related activities. These assessments follow the process set out in the IAQM guidance [RD12], which is a widely used and accepted approach to determine the risk associated with construction activities. It also sets out recommendations for mitigation based on the determined risk level. The greater the risk associated with the construction of a particular development, the higher the level of mitigation, controls, management and monitoring required.

Outline description of methodology

5.4.55 The key potential construction dust emission sources which are considered in the assessments are set out below. These have been assigned into the four categories specified in the IAQM dust assessment method of demolition, earthworks, construction and trackout.

- Demolition activities: demolition of buildings and associated infrastructure within the site boundaries, including the processing and storage of material associated with the demolitions and removal of vegetation, walls and other site clearance activities.
- Earthworks: activities such as establishing site compounds, extending existing haul roads or forming new haul roads and parking area, installing drainage, topsoil stripping and storage of topsoil, soil remediation and site

grading. For the Wylfa Newydd Development Area, this would also include the bulk earthworks associated with the site grading, operational platform creation and deep excavations for the Power Station, and formation of the landscape mounding as part of the landscape scheme. Another source is windborne dust from material stock piles, storage mounds and exposed areas, which could occur if the wind speed is high enough and the stored or exposed material is dry and friable.

- Construction activities: construction of building(s)/infrastructure and associated activities relating to the construction of the site compounds, and construction of any site buildings. For the Wylfa Newydd Development Area this also includes the construction of the Power Station and the Marine Off-Loading Facility.
- Vehicle movement and trackout: construction related vehicles moving on and around the construction areas emitting exhaust particulate matter and re-suspending loose material on the road. There would be the potential for spillage from transferring material around the site, and particulates being lifted from open container vehicles by the wind generated from the vehicle movement. Material 'tracked-out' onto the local road network on the wheels of site traffic could also be re-suspended by passing traffic.

5.4.56 Various data relating to the works associated with constructing the Power Station, Off-Site Power Station Facilities and Associated Developments are required to undertake the assessment in accordance with the IAQM methodology, for example:

- site areas;
- volume of earthworks, which for the construction of the Power Station refers to the volume of topsoil works, site grading, deep excavation and mound creation;
- soil type;
- number of plant and other equipment in operation;
- height of bunds or stockpiles;
- building volumes (demolition and construction);
- rock crushing;
- movements of HGVs such as lorries; and
- requirements for concrete batching, crushing and sand blasting.

5.4.57 Other data on the surrounding environment are required to allow the classification of the risk to be carried out, for example:

- background PM_{10} concentrations;
- the presence of human receptor locations within 350m of the construction site boundaries and/or within 50m of the access route(s) used by construction vehicles on the public highway;

- the presence of ecological receptors within 50m of the construction site boundaries and access routes; and
- the number of properties within set distance bands of the construction site boundaries, and their sensitivities to dust soiling and human health with regard to PM_{10} concentrations. The sensitivity of the ecological receptors to dust is also required.

5.4.58 The methodology in the guidance provides an assessment of three separate dust effects from the four activity types (demolition, earthworks, construction and trackout), which are:

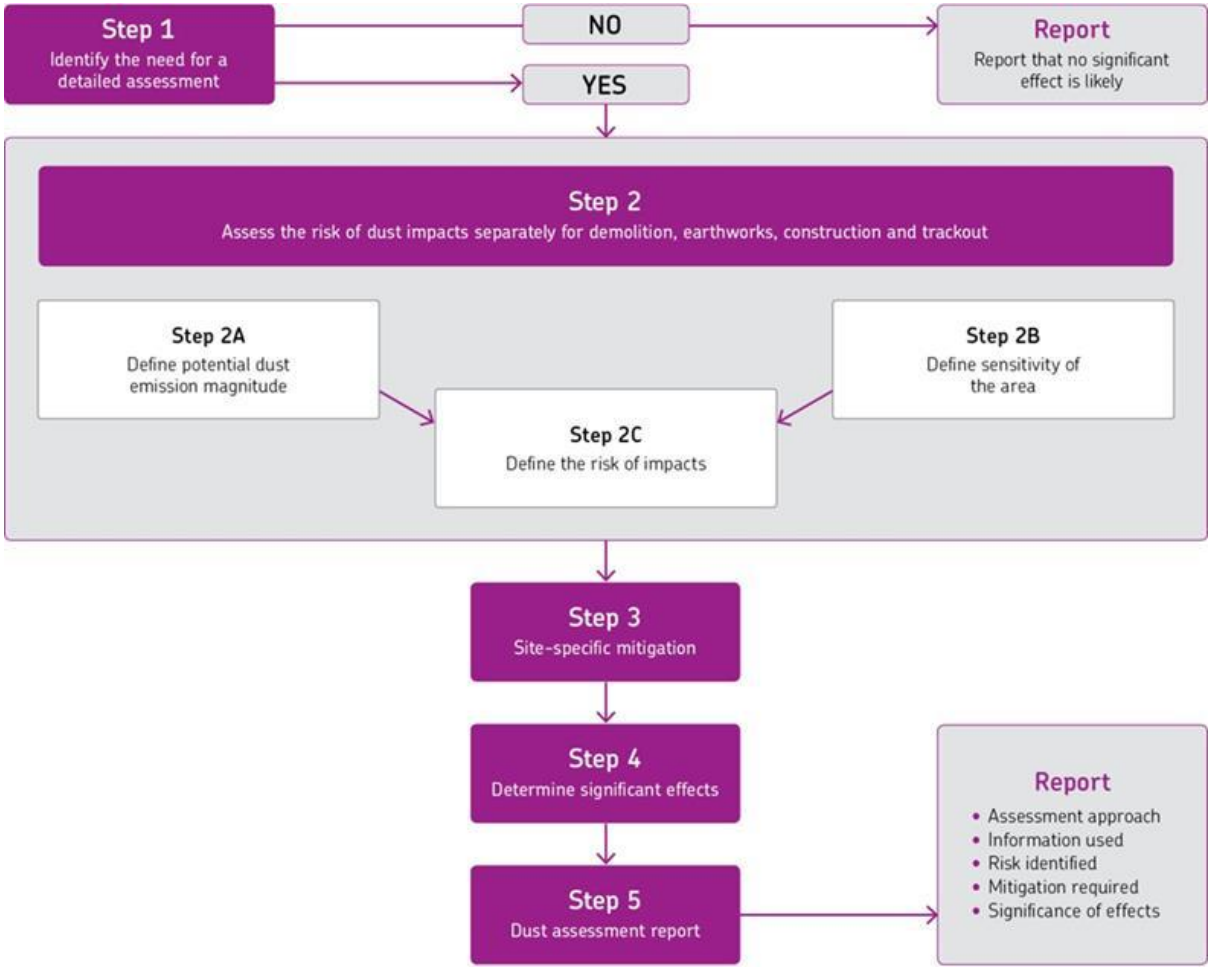
- annoyance due to dust soiling;
- the risk of health effects due to a significant increase in exposure to PM_{10}; and
- harm to ecological receptors due to dust soiling.

5.4.59 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 $PM_{2.5}$.

5.4.60 As discussed in more detail in paragraph 5.4.112, the construction dust assessment assigns a risk classification for each of the four activity types (demolition, earthworks, construction and trackout). This risk classification is then used to define the recommended site-specific mitigation to reduce the residual effects of construction dust emissions to be not significant. The construction works associated with any development would not normally proceed without the adoption of standard good practice dust mitigation measures and controls in place, and any significant adverse environmental effects are either avoided or reduced through design and management before the proposal is finalised, and thus the pre-mitigation effects are not applicable. Therefore, in line with the IAQM guidance, the site-specific mitigation measures set out in the air quality management strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and sub-CoCPs (Application Reference Numbers: 8.7 to 8.12) are considered to represent the good practice mitigation (i.e. mitigation that would be expected to be implemented as standard good practice). The significance of effects is only assigned to the construction dust emissions after considering the construction activities with the implementation of the embedded and good practice mitigation.

5.4.61 The methodology is summarised on Figure B5-1 and more detailed descriptions are provided in the individual dust assessments associated with the different volumes.

Figure B5-1 Structure of construction dust assessment using the IAQM method



5.4.62 The IAQM dust assessment methodology does not specifically cover any potential issues associated with the disturbance or removal of contaminated soils or materials that may result in the release of pollutants to air. This particular aspect is considered within the soils and geology assessment set out in chapters D7 (Application Reference Number: 6.4.7) and E7 (soils and geology) (Application Reference Number: 6.5.7).

Emissions of odours

5.4.63 Some of the activities during construction, particularly in relation to the topsoil stripping and some of the earthworks and tunnel excavation during construction, may generate odours associated with soils and vegetation. These would not be considered as offensive odours or likely to generate high levels of annoyance and subsequent complaints.

5.4.64 There are some areas within the Wylfa Newydd Development Area that have been identified as containing contamination, which could potentially be odorous once excavated, including chlorinated solvents and hydrocarbons. Further details of the location, scale of contamination and proposed remediation of these areas are provided in chapter D7 (Application Reference

Number: 6.4.7). The potential also exists that contamination may be present beneath the Off-Site Power Station Facilities; further details are provided in chapter E7 (Application Reference Number: 6.5.7).

5.4.65 There is potential for the release of odour from the package sewage treatment plant that would be installed for Main Construction.

5.4.66 There is also an existing sewage treatment works at Wylfa Head which needs to be considered, as it could potentially affect the amenity of residents in the Temporary Workers' Accommodation (Site Campus).

5.4.67 A risk-based qualitative assessment has been undertaken to consider the potential for odour effects to occur based on the scale of the odorous emissions, distance to nearby sensitive areas or receptors, prevailing weather conditions, and the embedded mitigation or good practice mitigation which would prevent or reduce odour emissions at source. This applied the main elements of the assessment approach set out in the IAQM's guidance on the assessment of odour for planning [RD15], as summarised below:

- the source odour potential is determined based on table 8 of the IAQM guidance [RD15], which considers the magnitude of the odour release taking into account any mitigation measures, how odorous the compounds are and the unpleasantness of the odour;
- identification of the closest sensitive receptors;
- the pathway effectiveness is estimated based on table 8 of the IAQM guidance [RD15], taking into account the effectiveness of the pollutant pathway as the transport mechanism for odour through the air to the receptor;
- the next step using table 9 of the IAQM guidance [RD15] combines the source odour potential and the pathway effectiveness to predict the risk of odour exposure at the receptor location; and
- the final step is to estimate the effect, ranging from negligible to large adverse, of that odour on the exposed receptor, taking its sensitivity into account (see table B5-13).

Emissions of pollutants from combustion sources

Overview of dispersion modelling

5.4.68 This section describes the general approach to dispersion modelling of emissions from combustion sources such as construction plant, machinery, marine vessels, road traffic, boilers and generators. The specific details for each type of emission source are provided in the following sections.

5.4.69 Dispersion modelling involves a mathematical simulation that incorporates atmospheric conditions and provides an estimate of the concentration of pollutants as they travel through the atmosphere away from the source of emissions. The various types of data inputs required for the dispersion models are as follows:

- emissions data (e.g. the emission concentration or mass emission rate of a pollutant from the modelled source including road traffic);
- details about the facility, process or road being modelled and related emissions parameters (e.g. stack or exhaust height and diameter, exhaust gas flow, exhaust gas temperature, number of vehicles and type, vehicle speed);
- location and type of the emission sources being modelled (for example, the sources can be configured as individual point sources, sources covering a specified area, or line sources to represent linear emissions such as roads);
- meteorological data representative of local weather conditions, which is used by the model in the dispersion calculations;
- dimensions and locations of nearby buildings or structures or the presence of street canyons as these can affect the dispersion from emission sources; and
- details on the local land use and topography as these can also affect the dispersion of emissions.

5.4.70 The location of where the output concentration of the emitted pollutants is calculated is also required in the model. This was undertaken by the setting of a modelling grid covering the study area, and specifying individual receptor points to represent nearby locations such as residential properties, schools, hospitals, care homes, recreational areas, footpaths, etc., and ecological receptors including SPAs, SACs, Ramsar sites, SSSIs, Ancient Woodland and Wildlife Sites.

5.4.71 After all the above data are inputted, the dispersion model is then run to provide the predicted concentrations of the released pollutants on the modelled grid, and at the receptor points for each year of meteorological data considered in the assessment.

5.4.72 For the assessment of emissions from construction plant, machinery and marine vessels, road traffic emissions and operational combustion plant, the modelled concentration from the emission sources included in the assessment

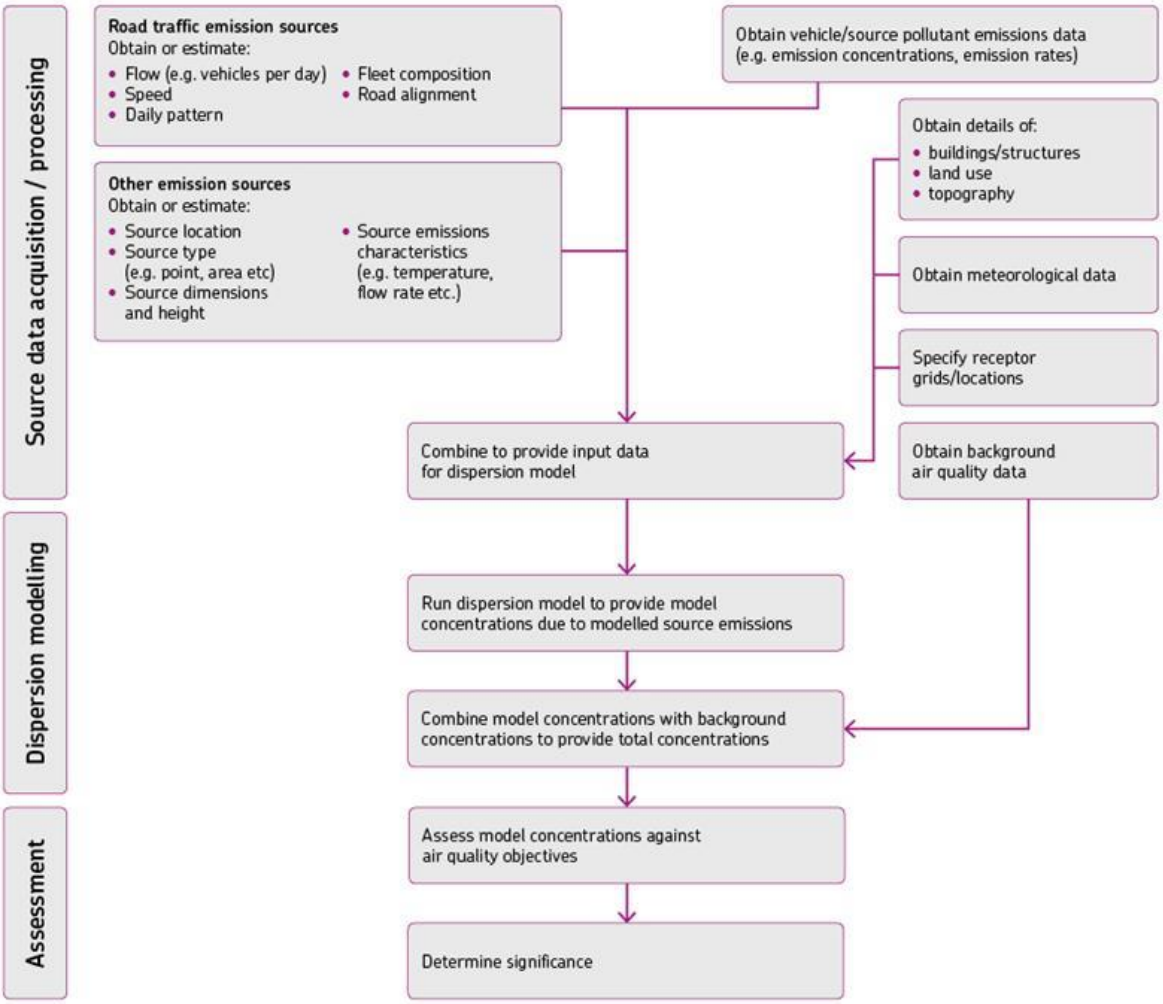
is known as the Process Contribution (PC). The PC is then added to the existing concentrations of each pollutant to determine the total predicted concentration, i.e. the Predicted Environmental Concentration (PEC). The PC and PEC are then compared to the relevant AQOs and EALs to provide an indication of the amount of change in pollutant concentrations, and if any exceedances of the AQOs or EALs are predicted.

5.4.73 The NOx and SO_2 concentrations predicted at the ecological receptors are then used to calculate the deposition rates of nutrient nitrogen and acid, which are then added to the existing deposition rate and compared to the relevant criteria.

5.4.74 Full details of the methodology used for the dispersion modelling of emissions to air of pollutants from combustion sources and the relevant study inputs and assumptions are set out in the chapters C4 (Application Reference Number: 6.3.4), D5 (Application Reference Number: 6.4.5) and associated appendices.

5.4.75 The dispersion modelling was carried out in line with accepted standard good practice including guidance produced by Defra [RD13] and set out in the Environment Agency risk assessment guidance adopted by NRW [RD14]. The dispersion modelling methodology is summarised in figure B5-2.

Figure B5-2 Structure of dispersion modelling assessment



Emissions from construction plant, machinery and marine vessels

5.4.76 This section describes the approach to dispersion modelling emissions from construction plant, machinery and marine vessels. The specific emissions to air from construction plant, machinery and marine vessels associated with construction may have the potential to affect nearby receptor locations as the scale and massing of on-site plant (such as earth-moving equipment) is relatively large. As the construction stage would last up to approximately nine years, and due to there being a number of different construction activities occurring simultaneously, it was considered appropriate to assess emissions to air from the associated construction plant and machinery (including marine-based plant and vessels) in detail.

5.4.77 The modelling was split into a number of scenarios to determine the potential effects during construction. The modelling procedure adopted for the assessment of construction plant, machinery and marine vessels is summarised below.

- It was necessary to understand the types of activities that would take place during the construction stage, where and when these activities would take place, and the type and number of plant, vehicles or vessels that would be used.
- A number of scenarios were developed to represent the activities on the Wylfa Newydd Development Area during construction, and the plant, machinery and marine vessels were assigned to various areas where works are proposed to take place during these scenarios. This included specifying volume sources within the model to represent working areas (e.g. where bulk earthworks and deep excavations were taking place, Marine Off-Loading Facility construction was being undertaken or new landscaped earth mounds were being created). This was supplemented with specific point sources or line sources to represent specific items of stationary plant or proposed haul routes, respectively. The scenarios are described in chapter D5 (Application Reference Number: 6.4.5).
- The emissions to air from each plant item or vessel were determined from the appropriate EU emission standards for non-road mobile machinery diesel engines, manufacturers' specifications or other relevant emissions standards for marine vessels; these are discussed in detail in appendix D5-2 (Application Reference Number: 6.4.21). Other details, such as the percentage of time during the working day that the plant or vehicle would be operating and the average power expended by the engine over that working day, were also required for the model. Further details of how these aspects were determined are described in chapter D5 (Application Reference Number: 6.4.5) and appendix D5-2 (Application Reference Number: 6.4.21).
- The modelling used meteorological data representative of conditions within the study area incorporating the Wylfa Newydd Development Area. The data cover each hour of the year, and include all the weather parameters required by the ADMS model to undertake the dispersion modelling, including wind speed, wind direction, temperature, rainfall and cloud cover. The Met Office NWP data representing 10 years of historical weather conditions were used for the modelling (2007 to 2016). A graphical presentation of the wind speed and direction (known as a 'wind rose') for the 2007 to 2016 dataset is shown in appendix D5-2 (Application Reference Number: 6.4.21) and also analysed in appendix D5-1 (Application Reference Number: 6.4.20).
- Other relevant details such as the topography of the Wylfa Newydd Development Area and surrounding area were required. As the topography of the Wylfa Newydd Development Area would change throughout construction, the topography representative of each modelled scenario was used for the assessment to represent local topography as much as possible.

- The model was run to calculate the predicted concentrations of each pollutant at the specified human and ecological receptor locations around the Wylfa Newydd Development Area. Nitrogen and acid deposition rates were also predicted at the ecological receptors.

5.4.78 Full details of the methodology used for the assessment of emissions to air from construction plant and machinery, and the relevant study inputs and assumptions are provided in chapter D5 (Application Reference Number: 6.4.5) and appendix D5-2 (Application Reference Number: 6.4.21).

Emissions from combustion plant (boilers and generators)

5.4.79 Emissions to air from combustion plant associated with operation of the Power Station have the potential to affect air quality at nearby receptor locations. The modelling procedure that was adopted for the assessment of emissions to air from the combustion plant is summarised below.

- The types of combustion plant proposed to be used during the operation of the Power Station are well defined. These include boilers to provide steam to meet various plant demands, and standby electrical power generation plant such as diesel generators and turbines used in the event of loss of power to ensure the safe operation of the Power Station.
  - A long-term scenario to include the typical operation of all the boilers and all standby generators that would be expected over the period of a year.
  - Several short-term scenarios to determine the maximum potential effects of various short-term operational scenarios such as maximum boiler use, routine testing and commissioning of the standby generators and also the use of all the combustion plant in an emergency situation.
- The various scenarios were developed to represent the long-term emissions and also the different short-term emissions from the combustion plant during commissioning, and then subsequent operation, of the Power Station. These were used to determine the potential air quality effects with regard to the relevant long and short-term AQOs and EALs. Details of the various emission scenarios are provided in chapter D5 (Application Reference Number: 6.4.5).
- The emissions from the combustion plant were defined as point sources representing the location of each exhaust or stack for each plant item. The location and dimensions of the nearby Power Station Site structures and buildings were also required, as these would affect the emissions from the exhausts or stacks.
- The emissions from each plant item were based on manufacturers' data and relevant emission limits set out in guidance or appropriate legislation; these are discussed in detail in chapter D5 (Application Reference Number: 6.4.5) and appendix D5-3 (Application Reference Number:

6.4.22). Other details including the stack diameter, flow and temperature of exhaust gases, and operating load of the combustion plant during the modelled scenario (e.g. whether a boiler was operating at 100% or 50% load) were established from Horizon's proposed operating regime and typical values. The details of these emissions parameters are provided in appendix D5-3 (Application Reference Number: 6.4.22).

- The modelling used the same meteorological data as previously described for the modelling of the construction plant, machinery and marine vessels (i.e. 10 years of historical weather data representative of the Wylfa Newydd Development Area for the period 2007 to 2016).
- The topography representing the completed landform of the Wylfa Newydd Development Area during operation of the Power Station was used for the assessment.
- The model was run to calculate the predicted concentrations of each pollutant at the specified human and ecological receptor locations around the Wylfa Newydd Development Area. Nitrogen and acid deposition rates were also predicted at the ecological receptors.

5.4.80 Full details of the methodology used for the assessment of emissions to air from the operational combustion plant, and the relevant study inputs and assumptions are provided in chapter D5 (Application Reference Number: 6.4.5) and appendix D5-3 (Application Reference Number: 6.4.22).

5.4.81 An initial stack height assessment was carried out to determine suitable stack heights for the various combustion plant items. This was used to inform the stack heights which were subsequently used for the assessment described above and presented in chapter D5 (Application Reference Number: 6.4.5).

Emissions from road traffic

Introduction

5.4.82 The Defra technical guidance LAQM.TG(16) [RD13] identifies NO_2 and PM_{10} as the substances which require consideration in relation to emissions from road vehicles. It is not considered necessary, in line with the LAQM.TG(16), to include SO_2 or CO in the scope of the modelling for road traffic emissions, as these pollutants would be emitted at levels which are very unlikely to significantly contribute to existing concentrations or lead to breaches of AQOs. The same also applies to other pollutants which have AQOs, such as benzene, lead, poly-aromatic hydrocarbons and 1,3-butadiene, which are not considered in the air quality assessments for the Wylfa Newydd Project. However, $PM_{2.5}$ was included within the assessment of road traffic (and non-road traffic) emissions.

5.4.83 The study area for the assessment of emissions from road traffic includes road links on the Isle of Anglesey and on mainland Wales. This assessment comprised two approaches:

- Isle of Anglesey study area – an assessment of the affected road links using dispersion modelling; and
- mainland Wales study area – an assessment of the affected road links using the *Design Manual for Roads and Bridges* (DMRB) screening method tool [RD30].

5.4.84 An overview of the two approaches is outlined below.

Isle of Anglesey study area

5.4.85 The Wylfa Newydd Project would give rise to changes in road traffic flows on the Isle of Anglesey. These changes, and the identification of the affected road network, are described in detail within chapter C4 (Application Reference Number: 6.3.4). The modelling procedure adopted to assess the effects of road traffic emissions is summarised below.

- AADT flows by vehicle type and average vehicle speed data have been compiled for a recent year (2016) and future years representing different stages of the Wylfa Newydd Project, for without the Wylfa Newydd Project (i.e. the future baseline flows) and with the Wylfa Newydd Project (i.e. the future baseline flows plus the road traffic associated with the Wylfa Newydd Project). All relevant committed developments are included in future baseline flows, see chapter C2 (Application Reference Number: 6.3.2) for a description of the committed developments included in the baseline traffic flows.
- Three scenarios representing different annual periods were assessed to enable consideration of the worst-case potential effects on air quality during construction and operation of the Power Station. These are described in chapter C4 (Application Reference Number: 6.3.4).
- The vehicle emissions from Defra's Emission Factor Toolkit (EFT) version 7 were applied in the dispersion model [RD31]. The emissions relevant to each assessment year were selected, including 2016 which was the year used for model verification. The NOx emissions have been subsequently uplifted to account for emerging evidence that real-world NOx emissions from road vehicles, particularly diesel cars, are higher than anticipated [RD32]. The approach followed for this uplift to NOx emissions, is outlined in paragraphs 5.4.86 to 5.4.91.
- The type, location, and physical dimensions of the affected road links (and other relevant nearby road links) are entered into the model.
- For the Park and Ride at Dalar Hir and the Logistics Centre at Parc Cybi, information on the number of vehicles entering the car parks, average distance travelled and average vehicle speed was compiled. The emissions from vehicle movements within the car parks, including cold start emissions and idling vehicles were based on emission factors provided by Defra [RD31] and the National Atmospheric Emissions Inventory [RD33].

- The meteorological datasets for the year 2016 used in the dispersion model include RAF Valley (Anglesey Airport), Mona Airfield and the Met Office NWP data for the Wylfa Newydd Development Area location. A full technical description is provided in appendix C4-1 (Application Reference Number: 6.3.27).
- The dispersion model was run to calculate predicted pollutant concentrations and deposition rates at the identified human and ecological receptor locations.

5.4.86 As discussed above, the modelling has been undertaken using EFT version 7.0 for the various verification and assessment years, which draws on emissions generated by the European Environment Agency COPERT 4 (v11.0) emission calculation tool, and includes updated NOx and PM_{10} emission factor assumptions for Euro 5 and Euro 6 vehicles.

5.4.87 These emissions are vehicle-weighted averaged emissions for the national vehicle fleet. Emissions factors are defined by year to represent the predicted vehicle fleet, the range of vehicle types and Euro emissions standards present across the fleet.

5.4.88 Historically, air quality modelling carried out using these emission factors has predicted large reductions in NOx emissions and concentrations in future years. However, in recent years, it has been realised that these reductions have not been reflected in ambient measurements close to roads [RD32]. This disparity relates primarily to the on-road performance of modern diesel vehicles. It is recognised that some modern diesels are performing no better than earlier models despite tighter approval standards being applied to these new vehicles. The EFT version 7.0 released by Defra in July 2016 [RD31] takes account of updated emission functions and updated information on fleet compositions, but does not directly address this disparity.

5.4.89 The CURED approach (Calculator Using Realistic Emissions for Diesels, version 2A) released by Air Quality Consultants Limited [RD34] is a spreadsheet tool aimed at addressing the disparity highlighted with the on-road performance of modern diesel vehicles. The tool uses the same fleet information and speed emissions curves as the Defra EFT version 7.0, but uplifts them to give higher emissions of NOx. There is no change to the emissions of other pollutants, and it is recognised that the on-road performance of petrol vehicles reflects the reductions in future years imposed by the Euro standards. The CURED approach has been used for this assessment, and is applied to NOx emissions only (and subsequent calculation of NOx and NO_2 background and total concentrations at sensitive receptors). All other pollutants (i.e. PM_{10} and $PM_{2.5}$) were modelled using the Defra EFT version 7.0.

5.4.90 The modelled road contributions of NOx, NO_2, PM_{10} and $PM_{2.5}$ were adjusted to correct them against measured road components derived from monitoring data, following the adjustment method set out in LAQM.TG(16) [RD13] and referred to as model verification and adjustment.

5.4.91 Full details of the methodology used for the assessment of emissions to air from road traffic, including the use of the Defra EFT version 7.0 and CURED approach to determine emissions, verification process, supporting tools and all relevant study inputs and assumptions, are set out in appendix C4-1 (Application Reference Number: 6.3.27).

5.4.92 Subsequent to undertaking the modelling of road traffic emissions, Defra released a new set of emissions factors, EFT version 8.0.1 which is based on the European Environment Agency COPERT V5.0 emissions functions [RD35]. A preliminary comparison of the EFT version 7.0 with CURED approach against the COPERT V5.0 emissions was undertaken by Air Quality Consultants Limited [RD36]. Although this does not provide a direct comparison to the EFT version 8.0.1, it provides a broad-brush prediction of how it would compare for the key pollutant, NOx. The comparison showed that for assessment years up to 2020, the EFT version 7.0 with CURED is likely to provide similar predictions of total NOx to those of a COPERT V5.0 based model (EFT version 8.0.1). For assessment years after 2020, the EFT version 7.0 with CURED is likely to predict higher emissions than a COPERT V5.0 based model. On this basis, the use of the EFT version 7.0 with CURED is considered to present a robust approach to the calculation of road vehicle emissions for the assessment.

Mainland Wales study area

5.4.93 As the increase in road traffic flows on mainland Wales would generally be less than the increase in road traffic on the Isle of Anglesey, a conservative, less detailed assessment approach has been carried out to identify if there is the potential for significant air quality effects to occur at sensitive locations adjacent to the affected road links on mainland Wales.

5.4.94 This assessment calculates the potential increases in pollutant concentrations and nitrogen and acid deposition at key human and ecological receptors adjacent to affected roads. This assessment is based on the year when the largest increase in road traffic occurs on mainland Wales due to the Wylfa Newydd Project. This is anticipated to occur in 2023 (i.e. Year 5 of the construction programme) based on the assumption that the Wylfa Newydd DCO Project would commence in 2019. Although the implementation year is subject to change, this would not materially change the conclusions of the assessment of road traffic emissions presented in chapter C4 (Application Reference Number: 6.3.4). If the Wylfa Newydd DCO Project commenced in 2020 instead of 2019, any relatively small increases in baseline traffic flows between 2023 and 2024 would be likely to be offset by improvements in emissions due to the increasing uptake of low-emission and zero-emission vehicles brought about by the adoption of more stringent emission standards.

5.4.95 The full details of the assessment methodology, including study inputs and assumptions, are provided in appendix C4-2 (Application Reference Number: 6.3.28). An overview of the approach is summarised below.

- Information on the increase in LGV and HGV flows and average vehicle speed for the assessment year was compiled from the information

developed as part of the assessment of traffic (see chapter C2, Application Reference Number: 6.3.2).

- The emissions from the increase in road vehicles were calculated based on the same method described above for the Isle of Anglesey study area (i.e. using the EFT version 7.0 and CURED approach).
- The closest human receptors within 200m of the affected roads were identified.
- All ecological receptors (SPAs, SACs and SSSIs) within 200m of the affected roads were identified.
- Using the DMRB screening method tool [RD30], modified to include the updated emissions data described in paragraphs 5.4.86 to 5.4.91, the increase in NO_2, PM_{10} and $PM_{2.5}$ concentrations was calculated at the identified receptor locations.
- Local roadside measurements of NO_2 and PM_{10}, recorded by CCBC, GC and FCC, background mapping data for $PM_{2.5}$ [RD24], and existing nitrogen and acid deposition rates, from the Air Pollution Information System (APIS) website [RD37], were obtained. These concentrations and existing deposition rates were combined with the predicted road contributions, which would result from the increase in road traffic, to determine the potential for significant effects based on the calculated increases in concentrations and deposition rates.

5.4.96 Similar to the dispersion modelling approach used for the Isle of Anglesey study area, the modelled road contributions of NOx, NO_2, PM_{10} and $PM_{2.5}$ were adjusted to correct them against measured road components derived from monitoring data in the base year, following the adjustment method set out in LAQM.TG(16) [RD13].

Emissions from road traffic – specific assessment methodology for the A5025 Off-line Highway Improvements

5.4.97 The A5025 Off-line Highway Improvements include the construction of four off-line road sections, which would bypass the settlement areas of Valley, Llanfachraeth, Llanfaethlu and Cefn Coch. The construction of the Power Station access road junction and roundabout is also included as part of the A5025 Off-line Highway Improvements.

5.4.98 The changes to the alignment would lead to decreases in pollutant concentrations at those receptors close to the current A5025 in the settlement areas described above, and increases in concentrations at receptors which are close to the new sections of the A5025. A specific assessment of the potential effects on local air quality (as a result of the changes to the alignment of the A5025) has been undertaken within this Environmental Statement (see chapter C4, Application Reference Number: 6.3.4). The assessment methodology is outlined in this section.

5.4.99 The assessment is based on the same dispersion modelling methodology adopted for assessment of road traffic emissions within the Isle of Anglesey study area. The assessment focuses only on those areas where the existing alignment of the A5025 changes due to the A5025 Off-line Highway Improvements. Full details of the dispersion modelling methodology are provided in appendix C4-1 (Application Reference Number: 6.3.27).

5.4.100 The dispersion modelling was undertaken for a scenario representing the opening year of the A5025 Off-line Highway Improvements (anticipated to be the year 2020 (i.e. year 2 of the construction programme) based on the construction schedule derived from an assumed start date of 2019) and considers the change in concentrations at receptors without and with the new A5025 sections in place. The model scenario includes the additional traffic on the road network due to the Wylfa Newydd Project (i.e. including construction traffic travelling to and from the Wylfa Newydd Development Area, Off-Site Power Station Facilities and Associated Development), thus providing an assessment of the alignment changes only. The modelled scenario representing the opening year of the A5025 Off-line Highway Improvements captures the worst case Wylfa Newydd Project effects for receptors close to sections of the A5025 that would be bypassed by the A5025 Off-line Highway Improvements (i.e. it represents the peak in traffic associated with the Wylfa Newydd Project just before the A5025 Off-line Highway Improvements commence operation). As discussed in paragraph 5.4.94, any delay to the commencement of the Wylfa Newydd DCO Project would not materially change the conclusions of the assessment of road traffic emissions presented in chapter C4 (Application Reference Number: 6.3.4). Further discussion of this is provided in chapter C4 (Application Reference Number: 6.3.4).

5.4.101 The receptors most likely to experience changes in pollutant concentrations were selected as worst case locations for discussion purposes, at each of the improvement sections. Worst case locations are those closest to the existing or proposed alignment and, therefore, likely to experience the largest changes in pollutant concentrations.

5.4.102 The predicted concentrations at receptors derived from the model outputs for before and after the implementation of the A5025 Off-line Highway Improvements were compared, and the description and significance of the effects of the alignment changes were determined using the EPUK/IAQM guidance [RD11]. This is consistent with the approach for the assessment of non-road traffic emission sources and road traffic emissions for the Isle of Anglesey and mainland Wales study areas described above, and proposed in the scoping report for the A5025 Off-line Highway Improvements Town and Country Planning Act application [RD38] and Development Consent Order scoping report addendum [RD39]. The likely scale of beneficial and adverse effects of the A5025 Off-line Highway Improvements for future assessment years will also be considered by reviewing the results at the same receptors for the assessment of future years. The assessment of future years is based on a comparison of the Wylfa Newydd Project (i.e. Wylfa Newydd Project traffic with the A5025 Off-line Highway Improvements in place) against a baseline of no Wylfa Newydd Project (i.e. no Wylfa Newydd Project traffic and

no A5025 Off-line Highway Improvements) as described in chapter C4 (Application Reference Number: 6.3.4).

5.4.103 An alternative methodology for assessing the air quality impacts from highway schemes is provided in the DMRB guidance [RD30] and a number of associated Interim Advice Notes (IANs). The DMRB guidance includes specific methods, emissions data and significance criteria. Although the adopted approach described above uses the same detailed assessment approach (i.e. undertaking dispersion modelling using the ADMS-Roads dispersion model), it does not apply all of the published DMRB guidance.

5.4.104 There have been several recent developments in the understanding of vehicle emissions, including new research and the release of new emissions data for vehicles. At the time of assessment, the DMRB guidance and associated IANs have not yet been updated by Highways England to account for this new data, although they are still used for highways projects by Highways England. However, the approach for the modelling of road traffic emissions for the Wylfa Newydd Project was altered to adopt newer emissions data and related assessment tools which are not part of the DMRB guidance, as described in paragraphs 5.4.86 to 5.4.91.

5.4.105 The proposed approach is considered to represent an appropriate and robust approach based on the following.

- The A5025 is not a trunk road or Welsh Government adopted road, so the requirement to follow DMRB is not fully applicable.
- The tools supporting DMRB and its associated IANs are being updated. Therefore, an alternative method has been used to utilise the most recent EFT data and peer-reviewed CURED approach for vehicle emissions, which negates the use of IAN 185/15 [RD40] and IAN 170/12 v3 [RD41].
- The published vehicle emissions embedded within the DMRB speed banding tool (IAN185/15) and derivations of long-term trends in NO_2 (IAN170/12v3) are based on older versions of the EFT (version 6 and version 5, respectively).
- Using the EPUK/IAQM guidance [RD11] is consistent with the approach to describing the effects and determining significance for all other Wylfa Newydd Project air quality effects (both road source and non-road source related).
- The EPUK/IAQM assessment [RD11] is aligned with the DMRB approach. Differences are mainly presented in the determination of significance; however, the level of assessment is as rigorous. The EPUK/IAQM approach [RD11] provides a greater level of granularity and lower threshold in the description of the impacts, as IAN 174/13 [RD42] only considers concentrations which are above the relevant AQOs either before or after the scheme (i.e. reflective of its intended use for major trunk roads and motorway schemes).

Decommissioning

5.4.106 It has been assumed that the magnitude of air quality effects associated with the decommissioning activities would be less than that associated with the construction activities due to the following:

- there are likely to be less earthworks required than during the construction stage, and there is unlikely to be a requirement for any earthworks activities close to the site boundaries; and
- not all construction materials brought to the site would need to be removed, and the peak decommissioning workforce is likely to be significantly less than the peak construction workforce, resulting in lower road and marine transport movements.

Assessment of effects

5.4.107 There are a variety of aspects associated with the assessment of air quality, such as the range of different emission types or sources; pollutants, each with different effects; the consideration of long- and short-term averages; and types of receptors and sensitivities. Consequently, the description of the air quality assessment criteria is necessarily complex and lengthy. The criteria adopted for this assessment are set out in the following sections, which describe how they apply to the air quality assessment topics detailed below:

- assessment of dust emissions from construction-related activities which could affect amenity, human health and sensitive ecological sites;
- assessment of odour emissions which could affect amenity;
- protection of human health based on the modelling of emission sources, and prediction of concentrations of pollutants at specific receptors or locations; and
- protection of sensitive vegetation and ecosystems based on the modelling of emission sources, and prediction of concentrations of pollutants and deposition rates of nitrogen and acid at specific ecological receptors.

5.4.108 A description of how the significance of the effects would be determined is also provided. The process for defining significance is prescribed in accepted standard good practice guidance documents developed by regulatory authorities and working groups comprising experienced air quality professionals, local authority officers and public healthcare bodies [RD11; RD12; RD14; RD15]. The approach described in paragraphs 5.4.111 to 5.4.150 to define significance for each of the four aspects described in paragraph 5.4.107 does not directly align with the overall approach to the categorisation of the value of receptors, magnitude of change or the determination of the significance level set out in chapter B1 (Application Reference Number: 6.2.1). This is because the relevant guidance on this subject relates to defining whether an air quality effect is significant or not across the study areas as a whole, rather than at individual properties (or at

specific sensitive ecological sites). As set out in the guidance, it is not appropriate to define a level of significance to air quality effects. The approach adopted is described in the paragraphs 5.4.111 to 5.4.150.

5.4.109 The level of value of a receptor is already incorporated within the specific methods prescribed in the standard good practice guidance documents for describing the effects and ultimately defining the significance of air quality effects, as discussed below. This is because the guidance is based on compliance with AQOs (which are specified in legislation) or the criteria themselves are different for receptors of different value. Where possible, a magnitude of change has been specified for the air quality effect to help inform the determination of the significance, but this is not possible for all effects considered, particularly for effects on ecological receptors, where the prescribed guidance does not include the classification of magnitude of change.

5.4.110 However, the overall approach is broadly consistent with the evaluation of the significance of environmental effects described in chapter B1 (Application Reference Number: 6.2.1) of this Environmental Statement and takes into account the determination of significance approach within chapter B1 (Application Reference Number: 6.2.1).

Emissions of dust

Criteria

5.4.111 As previously noted, standard good practice guidance has been used for the consideration of dust generated by the construction related activities [RD12]. The guidance uses a consistent approach to define the risk associated with the activities in order to specify the level of mitigation required to prevent or reduce the risk of emissions from these activities. The risk is defined from the dust emission magnitude and the sensitivity of the area in the vicinity of the Wylfa Newydd Development Area, which are determined during step two of the dust assessment (see Figure B5-1).

5.4.112 The risk definitions for the four categories of potential dust effects (demolition, earthworks, construction and trackout) are shown in table B5-12. Further explanation on how the dust emission magnitude and area sensitivity have been defined is provided in appendix D5-1 (Application Reference Number: 6.4.20) and the construction dust assessments in appendices E5-1 (Application Reference Number: 6.5.13), F5-1 (Application Reference Number: 6.6.13), G5-1 (Application Reference Number: 6.7.17) and H5-1 (Application Reference Number: 6.8.13). The sensitivity of the receptors is based on the IAQM guidance [RD12]. For example, a high sensitive receptor for dust soiling is a residential property. A medium sensitivity receptor would include parks or places of work and low sensitivity receptors include playing fields and footpaths. For ecological receptors, an example of high sensitivity receptors includes a European Designated Site with designated features which could be affected by dust soiling or other sites where there are particularly dust sensitive species present. A medium sensitivity receptor would include a nationally designated site with features which may be affected

by dust. A low sensitivity receptor would include a local designated site with dust sensitive features.

Table B5-12 Risk classification for dust effects

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

Determining significance

5.4.113 Step three of the IAQM dust assessment method [RD12] identifies the appropriate site-specific mitigation that is required based on the dust risk categories determined for each of the four activity types (demolition, earthworks, construction and trackout). The relevant and appropriate measures to mitigate dust emissions are set out in the air quality management strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and sub-CoCPs (Application Reference Numbers: 8.7 to 8.12). This process is described in paragraph 5.4.116.

5.4.114 The approach in step four of the IAQM dust assessment guidance [RD12] 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".

5.4.115 The IAQM guidance [RD12] 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".

5.4.116 Step four of the IAQM guidance [RD12] recognises that the key to the above approach is that it assumes that the regulators, such as the IACC, would ensure that mitigation measures, and any appropriate monitoring, are implemented by the appointed contractor. The environmental management of the construction works would be co-ordinated through the application of air quality management strategy as set out within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and sub-CoCPs (Application Reference Numbers: 8.7 to 8.12). These would include the necessary systems and procedures to facilitate ongoing checking by the regulators to ensure that dust mitigation is being delivered, and that it is effective at reducing any effect to not significant, and statutory dust nuisance issues would not be anticipated.

Emissions of odour

Criteria

5.4.117 IAQM guidance [RD15] has been used for the assessment of potential odour emissions. The guidance uses a consistent approach to define the risk of odour exposure to determine a magnitude of odour effect at specific receptor locations. The risk is defined from the source odour potential, pathway effectiveness and the sensitivity of the receptor in the vicinity of the source of odour (as set out in more detail in the guidance [RD15].

5.4.118 The definitions of the magnitude of likely effects at specific receptor locations are shown in Table B5-13. Further explanation on how the risk of odour exposure and receptor sensitivity have been defined is provided in the IAQM guidance [RD15].

Table B5-13 Likely magnitude of odour effects at receptor locations

Risk of odour exposure	Receptor sensitivity [1]		
	Low	Medium	High
High risk of odour exposure	Small adverse effect	Medium adverse effect	Large adverse effect
Medium risk of odour exposure	Negligible effect	Small adverse effect	Medium adverse effect
Low risk of odour exposure	Negligible effect	Negligible effect	Small adverse effect
Negligible risk of odour exposure	Negligible effect	Negligible effect	Negligible effect

Note 1: It is noted that the IAQM guidance [RD15] refers to slight, moderate and substantial; these terms have been changed for consistency with the overall EIA terminology adopted in the Environmental Statement.

Determining significance

5.4.119 The criteria set out in table B5-13 present the magnitude of likely odour effects at each sensitive receptor. Where there are multiple receptors, an overall effect on the surrounding area is required. The guidance [RD15] states: *"this requires the competent and suitably experienced Air Quality Practitioner to apply professional judgement"*.

5.4.120 Similar to determining significance for the protection of human health in paragraph 5.4.132, the professional judgement of a significant effect occurring was based on the overall balance of effects across the study area.

Emissions of pollutants – protection of human health

Criteria

5.4.121 The assessment criteria for the dispersion modelling assessment of emissions of pollutants to air from combustion emissions are based on the statutory AQOs, which exist in the UK. These cover the air quality limit values set out in the EU Ambient Air Quality Directive (2008/50/EC) discussed in table B5-1. Where applicable, the relevant EALs specified in the Environment Agency risk assessment guidance [RD14] have also been included. These supplement the AQOs, but are not set out in legislation and are consequently not a statutory obligation. The relevant AQOs and EALs are set out in table B5-14.

Table B5-14 Relevant AQOs (and EALs) for the protection of human health

Pollutant	Concentration ($\mu g/m^3$)	Measured as
NO_2	40	Annual mean
	200	One-hour mean not to be exceeded more than 18 times per year (equivalent to the 99.8th percentile)
PM_{10}	40	Annual mean
	50	24-hour mean not to be exceeded more than 35 times per year (equivalent to the 90.4th percentile)
$PM_{2.5}$	25	Annual mean
SO_2	266	15-minute mean not to be exceeded more than 35 times per year (equivalent to the 99.9th percentile)
	350	One-hour mean not to be exceeded more than 24 times per year (equivalent to the 99.7th percentile)
	125	24-hour mean not to be exceeded more than three times per year (equivalent to the 99.2nd percentile)
CO	10,000	Maximum running eight-hour mean
	30,000 (EAL)	Maximum one-hour mean

Determining significance

5.4.122 As well as comparing the total predicted concentrations to the respective AQOs or EALs, the determination of the significance of the potential changes in concentrations of pollutants was assessed based on guidance produced by the EPUK and the IAQM [RD11].

5.4.123 The EPUK/IAQM guidance [RD11] describes effects on air quality, whether adverse or beneficial, which will have an effect on human health that can be judged overall as significant or not significant. An effect is the change in the concentration of an air pollutant, as experienced by a receptor, as the result of a new development. This may have implications for the health of a human receptor, depending on the severity of the predicted effect, along with other factors that may need to be taken into account.

5.4.124 The EPUK/IAQM guidance [RD11] sets out an assessment framework for describing air quality effects from a dispersion modelling assessment that can

be used as a starting point to make a judgement of the overall significance of effect. The guidance states the following[2]:

"…the assessment may use its own set of criteria to define magnitude, but the important matter to be concluded is the likely significant effects of the impacts on air quality. There is, therefore, a two-stage process to be followed in the assessment:

- a qualitative or quantitative description of the impacts on local air quality arising from the development; and
- a judgement on the overall significance of the effects of any impacts."

5.4.125 The method for determining the quantitative description of the effects adopted for this modelling assessment (in relation to changes to long-term predicted concentrations) is based on the effect descriptors specified in the EPUK/IAQM guidance [RD11] as set out below in table B5-15. The effect descriptors are equivalent to the magnitude of change as described in chapter B1 (Application Reference Number: 6.2.1), and the value of the receptor is inherent in the EPUK/IAQM methodology [RD11], as it is based on compliance with air quality standards derived from national legislation.

Table B5-15 Effect descriptors for individual receptors (long-term concentrations)

Long-term average concentration at receptor in assessment year	Percentage change in concentration relative to AQO 1, 2			
	1% 3	2–5%	6–10%	>10%
75% or less of AQO	Negligible	Negligible	Small	Medium
76% to 94% of AQO	Negligible	Small	Medium	Medium
95% to 102% of AQO	Small	Medium	Medium	Large
103% to109% of AQO	Medium	Medium	Large	Large
110% or more of AQO	Medium	Large	Large	Large

Note 1: table intended to be used by rounding the percentage change to whole numbers.
Note 2: it is noted that the EPUK/IAQM guidance [RD11] refers to slight, moderate and substantial; these terms have been changed for consistency with the overall EIA terminology.
Note 3: any changes of 0% (i.e. less than 0.5%) are described as negligible.

5.4.126 Research undertaken on behalf of Defra and the devolved administrations [RD13] identified that road traffic emission related exceedances of the NO_2 one-hour mean AQO are unlikely to occur where the annual mean is below 60µg/m^3. Similarly, the number of road traffic emission related exceedances of the 24-hour mean AQO for PM_{10} of 50µg/m^3 may be estimated using the relationship set out in LAQM.TG(16) [RD13], which implies that the 24-hour

[2] The EPUK/IAQM guidance uses the term "impact" to describe the change at specific locations due to the proposed scheme or development. For this assessment, the term "effect" is used and the significance of the overall effect on air quality is derived from the consideration of the predicted individual effects at the assessed receptors.

mean AQO for PM_{10} is likely to be met if the predicted annual mean PM_{10} concentration is 31.8µg/m^3 or less.

5.4.127 The EPUK/IAQM guidance [RD11] recommends that, for determining the severity of an effect for short-term concentrations, the background concentrations are less important and effects should be described using peak concentrations from the modelled source(s). The guidance also provides effect descriptors for predicted short-term concentrations. Similar to the effect descriptors for long-term concentrations set out in table B5-15, they are equivalent to the magnitude of change as described in chapter B1 (Application Reference Number: 6.2.1). The effect descriptors for short-term changes in concentrations taken from the EPUK/IAQM guidance [RD11] associated with non-road traffic emissions are set out in table B5-16.

Table B5-16 Effect descriptors for individual receptors (short-term concentrations)

Percentage change in concentration relative to AQO			
10% or less	**11–20%**	**21–50%**	**>50%**
Negligible	Small	Medium	Large

Note 1: table intended to be used by rounding the percentage change to whole numbers.

5.4.128 A key consideration is the very conservative approach used to determine the maximum short-term concentrations for the combustion plant during operation of the Power Station (specifically, the standby generators). The approach is based on the modelling of the standby generators on a continuous basis to ensure the worst meteorological conditions are considered, even though these sources would only operate for a relatively small number of hours per year for initial commissioning, and then routine testing. Where this approach leads to a predicted exceedance of a short-term AQO, a specific statistical method is proposed to be used to determine the probability of the AQO actually being exceeded based on the operational hours of the emission sources (i.e. calculating the probability of the one-hour mean NO_2 concentrations exceeding 200µg/m^3 more than 18 times at each receptor location).

5.4.129 For the determination of significance, it is assumed that a modelled exceedance of the AQO is a potentially significant effect. However, due to the conservative assessment approach, it is necessary to compare the calculated probability of the AQO exceedance occurring to an acceptable probability threshold. The threshold adopted by Defra and the Welsh Government as part of their consultation on the Medium Combustion Plant Directive [RD43] was based on the operational lifetime of the plant. If the probability of an exceedance occurring was less than the operational lifetime of the combustion plant (assumed to be 20 years in the Defra and the Welsh Government consultation document), then a breach of the AQO would be unlikely. The anticipated operational lifetime of the Power Station is 60 years. On this basis, a probability of less than 1 in 60 years (i.e. 0.0167) was adopted as the acceptable probability threshold. If the calculated probability of an exceedance occurring was less than 0.0167, this would represent an unlikely significant effect. If the calculated probability of an exceedance was higher than 0.0167, this would represent a likely significant effect.

5.4.130 This approach has been discussed and agreed with NRW via the issue of a Technical Note [RD44 and RD45]. The methodology for the calculation of the probability of an exceedance occurring is set out in detail in appendix D5-3 (Application Reference Number: 6.4.22).

5.4.131 The framework discussed above was used as the initial basis for judging the overall significance of the effects of air quality at human receptors which are made using professional judgement. The EPUK/IAQM guidance [RD11] states that *"the reasons for reaching the conclusions on significance should be transparent and set out logically."* The professional judgement included consideration of the following:

- the existing and future air quality in the absence of the development;
- the extent of the population exposure to the effects (for example, the description of the effects at the receptors and number of properties affected by small, medium or large air quality effects);
- the influence and validity of any assumptions adopted in undertaking the assessment; and
- other factors where relevant.

5.4.132 As discussed in the EPUK/IAQM guidance [RD11], the judgement of a significant effect occurring would be based on the overall balance of effects across the study area. It is more straightforward to conclude that the development is not significant if all the effects are described as negligible or small. Similarly, if the majority of effects are described as medium or large, it is more straightforward to conclude that the development leads to a significant air quality effect. It is more difficult to identify the significance of the air quality effects in the intermediate region where there is more uncertainty in the transition from not significant to significant.

Health effects of air pollutants

5.4.133 As stated in national air quality policy guidance, there is a growing body of research that suggests that NO_2 and particulates, in particular $PM_{2.5}$, are closely associated with health impacts, and that there is a lack of evidence to indicate that there is a concentration below which health impacts do not occur [RD8] [RD46], mostly in relation to particulates [RD47].

5.4.134 On this subject, policy guidance [RD8] states:

> "However, the national air quality objectives are not 'safe' levels of air pollution. Rather they represent a pragmatic threshold above which government considers the health risks associated with air pollution are unacceptable."

5.4.135 In line with the accepted air quality assessment guidance [RD11] [RD12], the air quality assessment, and determination of significance, was based on compliance with the AQOs as these represent the current legislative position on health risks associated with air pollution in Wales. To acknowledge that there are potential health risks associated with concentrations of NO_2, $PM_{2.5}$ and PM_{10} below the AQO concentrations, the predicted changes in air quality

due to activities associated with the Wylfa Newydd Project have also been assessed as part of the Health Impact Assessment Report (Application Reference Number: 8.19). Consideration of the potential health risks, particularly those associated with emissions of dust and particulates ($PM_{2.5}$ and PM_{10}), are also taken into account in the proposed mitigation as set out in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and sub-CoCPs (Application Reference Numbers: 8.7 to 8.12) with the aim of keeping concentrations of these pollutants to as low a level as is reasonably practicable (in line with the aim of the policy guidance [RD8]).

Emissions of pollutants – protection of habitats and ecosystems

Criteria

5.4.136 The modelled concentrations at ecological receptors due to emissions from combustion sources were compared to the relevant critical levels for the protection of vegetation and ecosystems, as set out in table B5-17. A critical level is an air quality standard or guideline for ambient concentrations of a pollutant that applies at ecological receptors. Similar to the assessment criteria set out for the protection of human health, there are AQOs and EALs that exist for the protection of vegetation and sensitive ecological sites.

Table B5-17 AQOs (and EALS) for the protection of vegetation and ecosystems

Pollutant	Concentration ($\mu g/m^3$)	Measured as
NOx	30	Annual mean
	75 (EAL)	Maximum 24-hour mean (for sensitive lichen communities and bryophytes, and ecosystems where lichens and bryophytes are an important part of the ecosystem's integrity)
	200 (EAL)	Maximum 24-hour mean
SO_2	10 (EAL)	Annual mean (for sensitive lichen communities and bryophytes, and ecosystems where lichens and bryophytes are an important part of the ecosystem's integrity)
	20	Annual mean

5.4.137 Evidence from experiments [RD48] indicates that 200µg/m^3 of NOx may be an appropriate critical level for a 24-hour mean exposure. However, interactions between NOx, SO_2 and ozone (O_3) can affect the assimilation of NOx by plants, and in the presence of concentrations of the latter compounds near or above their critical levels, 75µg/m^3 of NOx is considered a more appropriate critical level [RD48].

5.4.138 Following a review of SO_2 and O_3 data in the vicinity of the Wylfa Newydd Development Area, it was concluded that there is a very low potential for additive effects of NOx with SO_2 or O_3 at locations where lichens and

bryophytes are not present due to the low SO_2 and O_3 background concentrations. As advised by NRW, it was appropriate to apply the 24-hour mean critical level of 200µg/m^3 at all locations apart from where lichens and bryophytes are present [RD49]. Where lichens and bryophytes are present, a critical level of 75µg/m^3 was adopted (i.e. a much lower concentration that reflects the sensitivity of lichens and bryophytes to NOx exposure). Following review of the ecological receptors, the critical level of 75µg/m^3 was adopted at the following ecological sites:

- Anglesey and Llyn Fens SAC and Ramsar;
- Cae Gwyn SSSI;
- Holy Island Coast SPA and SAC;
- Tre'r Gof SSSI; and
- Arfordir Trwyn y Buarth – Porth Wen Wildlife Site.

5.4.139 The modelled nitrogen and acid deposition at ecological sites was compared to the relevant critical loads. The critical loads for designated habitat sites in the UK have been published by the Centre for Ecology and Hydrology, and are available from the UK APIS website [RD37]. Critical loads are defined on the APIS website as, "…*a quantitative estimate of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge*."

5.4.140 The critical loads for the ecological sites considered in this assessment are set out in appendix B5-2 (Application Reference Number: 6.2.19). The critical loads for nutrient nitrogen deposition for the SACs, SPAs, Ramsar sites and SSSIs included in the assessment were provided by NRW [RD50] (see table B5-10). The selection of the acid deposition critical load for SACs, SPAs, Ramsar sites and SSSIs was based on identifying the vegetation or habitat types present at each site using the 'site relevant critical loads' function on the APIS website [RD37]. This tool provides a list of the habitat interest features that are present at each designated ecological receptor. It then lists all the specific priority habitats within that habitat interest feature regardless of whether they are present at the ecological receptor or not. Where relevant, the qualifying features identified in the citations were selected from this list of priority habitats and the lowest critical load (i.e. the most stringent) from those priority habitats actually present at the site was used for the assessment. Where it was not possible to select specific priority habitats listed for each interest feature, the lowest critical load for any of the specific priority habitats listed under each habitat interest feature present at the site was used for the assessment.

5.4.141 For Ancient Woodlands and Wildlife Sites, the 'search by location' tool was used to determine the critical loads for these ecological sites, and the specific habitat features present at each site were selected from the APIS website [RD37].

5.4.142 Assumed deposition rates of nitrogen and acid vary based on whether they are depositing on short or tall vegetation. Where an ecological receptor contained habitat types representing both tall and short vegetation, existing

deposition rates and critical load values were obtained for each of these separately. These are referred to as 'tall vegetation' (such as trees and hedges) and 'short vegetation' (such as grasses and plants) in this Environmental Statement chapter.

5.4.143 For nitrogen deposition, the critical loads are provided as a range, and it is accepted standard good practice to apply the lower end of the range in the determination of significance of the predicted increase, as advised by NRW [RD50]. For acid deposition, it is more complex as the critical load is made up of a number of values that represent a critical load function, based on the nitrogen and sulphur-derived acid deposition. There are rules on how this critical load function should be applied (as specified on the APIS website [RD37]), which were followed for the assessment. The APIS website [RD35] states that if the PEC for nitrogen-derived acid deposition is less than the CLminN[3] then the PC and PEC should be assessed using the following formulas:

- PC as a percentage of critical load function = (PC sulphur-derived deposition/CLmaxS)*100
- PEC as a percentage of critical load function = (PEC sulphur-derived deposition/CLmaxS)*100

5.4.144 Where the PEC for nitrogen-derived acid deposition is greater than the CLminN, the combined inputs of sulphur and nitrogen need to be considered, and the following formula should be used:

- PC as a percentage of critical load function = (PC of nitrogen and sulphur-derived deposition/CLmaxN)*100
- PEC as a percentage of critical load function = (PEC of nitrogen and sulphur-derived deposition/CLmaxN)*100

5.4.145 For the majority of sites across the UK, the PEC for nitrogen-derived acid deposition is greater than the CLminN[3] and therefore the CLmaxN approach is used. This was the case for this air quality assessment for all ecological receptors except for Llyn Llygeirian SSSI for the operational and construction assessments (see chapter D5, Application Reference Number: 6.4.5) and Beddmanarch-Cymyran SSSI for the traffic assessment (see chapter C4, Application Reference Number: 6.3.4) where the PEC for nitrogen-derived acid deposition was less than the CLminN[3]. Therefore, for these two ecological receptors the guidance suggests that the CLmaxS[3] approach should be used. However, the results for both approaches have been presented (where relevant) in the results tables in chapter C4 (Application Reference Number: 6.3.4) and D5 (Application Reference Number: 6.4.5) and the highest result has been considered.

[3] CLMaxN, CLminN and CLmaxS are specific critical loads as defined by APIS [RD37].

Determining significance

5.4.146 Where appropriate, the significance of the predicted long-term (annual mean) concentrations or deposition at ecological receptors (specifically SACs, SPAs, Ramsar sites and SSSIs) were determined in line with guidance provided by NRW during consultation, which was derived from the Environment Agency guidance [RD14]. This is summarised below.

- Where the PC is less than 1% of the relevant critical level or critical load, the emission is not likely to have a significant effect alone or in combination irrespective of the existing concentrations or deposition rates.
- Where the PC is above 1%, further consideration of existing background concentrations or deposition rate is required, and where the total concentration or deposition is less than 70% of the critical level or critical load, calculated in combination with other committed projects or developments included within the traffic data, the emission is considered to be unlikely to have a significant effect.
- Where the contribution is above 1%, and the total concentration or deposition rate is greater than 70% of the critical level or critical load, either alone or in combination with other committed projects or developments, then this may indicate a significant effect and further consideration is likely to be required. This would occur on a site-by-site basis through determination of the applicability of the critical levels, directly applicable critical loads at each site, and further assessment by qualified ecologists as part of the assessment set out in chapter D9 (Application Reference Number: 6.4.9).

5.4.147 The above approach is used to give a clear definition of what effects can be disregarded as insignificant, and which need to be considered in more detail in relation to the predicted annual mean concentrations or deposition. For short-term mean concentrations at SACs, SPAs, Ramsar sites and SSSIs (i.e. the 24-hour mean critical level for NOx) where the PC is less than 10% of the critical level, it would be regarded as insignificant. A potentially significant effect would be identified where the short-term PC from the modelled sources would lead to the total concentration exceeding the critical level. In this case, further consideration would be required within the relevant terrestrial and freshwater ecology assessments.

5.4.148 For other sites, such as the assessed Ancient Woodland sites and Wildlife Sites, guidance set out in the Environment Agency risk assessment guidance [RD14] states that:

"If your emissions meet both of the following criteria they're insignificant – you don't need to assess them any further:

- the short-term PC is less than 100% of the short-term environmental standard

- the long-term PC is less than 100% of the long-term environmental standard".

5.4.149 This guidance was adopted for use in this assessment for the identification of potentially significant effects at the Ancient Woodlands and Wildlife Sites.

5.4.150 Based on the specific guidance for the determination of significance described above, it is not possible to assign a magnitude of change descriptor to the predicted changes in ambient concentrations of pollutants or deposition rates at sensitive ecological sites due to the varying methods specified for determination of the significance of effects. As with the consideration of effects at human receptors, the value of the receptor is built into the criteria for the determination of significance. Therefore, it cannot be individually assigned a descriptor in line with the general approach specified in chapter B1 (Application Reference Number: 6.2.1) of this Environmental Statement.

Inputs into the cumulative effect assessments

5.4.151 The methodology adopted for the combined topic effect assessment chapters C7 (Application Reference Number: 6.3.7), D16 (Application Reference Number: 6.4.16), E12 (Application Reference Number: 6.5.12), F12 (Application Reference Number: 6.6.12), G12 (Application Reference Number: 6.7.12) and H12 (Application Reference Number: 6.8.12) and the cumulative effects assessment presented in volume I (Application Reference Numbers: 6.9.1 to 6.9.5) requires consideration of all residual effects that are minor adverse or greater (see section 2.1 of chapter I2 scope, Application Reference Number: 6.9.2). However, as explained in this chapter, the conclusions of the air quality assessments (dust, odour and air pollutants) predict either a significant or not significant level of effect across the specific study area rather than a determination of the significance on an individual receptor basis. Furthermore, unlike other topic assessments presented in this Environmental Statement, the adopted method for the air quality assessment, which is based on good practice air quality, dust and odour planning guidance documents developed by EPUK and IAQM [RD11, RD12 and RD15], does not provide for any sub categorisation of the level of significance beyond 'significant' or 'not significant' (i.e. there is no categorisation of the significance into negligible, minor, moderate or major). Therefore, professional judgement has been exercised in order to determine which effects are taken into consideration in the combined topic and cumulative effect assessments. The basis adopted to apply this professional judgement consistently to decide which air quality effects are included in the combined topic and cumulative effect assessments is explained below.

5.4.152 For the assessment of dust, only the medium or high risk dust effects identified in the assessments for human receptors have been considered within the combined topic and cumulative assessments and the appropriate receptors within the study areas close to the developments meeting these criteria were included. Where a negligible or low risk of effect is identified, this is considered not substantive and so it is not considered within the combined topic or cumulative assessments.

5.4.153 For the assessment of odours, an approach has been adopted where only the small, medium or large adverse odour effects identified in the assessment for human receptors were considered within the combined topic and cumulative assessments. Where a negligible effect is identified, this is considered not substantive and so was not considered within the combined topic or cumulative assessments.

5.4.154 For exhaust emissions of pollutants (i.e. NOx, NO_2, CO, SO_2, PM_{10} and $PM_{2.5}$) during construction from plant, machinery and marine vessels, project-wide road traffic emissions or operational combustion plant emissions, an approach has been adopted where only the medium and large adverse effects (i.e. the effect descriptors as described previously in this section which are not directly representative of the significance of effect) predicted for the changes in pollutant concentrations at human receptors were considered within the cumulative assessment. Negligible or small adverse effects would not contribute to significant cumulative effects. Given the potential for increases in pollutant concentrations in close proximity to the Wylfa Newydd Development Area (based on the medium and large adverse effect descriptors predicted for the changes in NO_2 concentrations at human receptors due to emissions from plant, machinery and marine vessels as set out in chapter D5 (Application Reference Number: 6.4.5), it was considered prudent to determine the intra-project effects of emissions associated with the construction and operation of the Power Station (i.e. WNDA Development) combined with the project-wide road traffic emissions from the nearby A5025. This was requested by consultees during pre-application consultation.

5.4.155 It should be noted that the potential for significant effects on population and human health, including the combined effects, are considered separately in the Health Impact Assessment Report (Application Reference Number: 8.19).

5.4.156 The combined topic and cumulative effects on ecological receptors are considered within the terrestrial and freshwater ecology assessment which considers the significance of the cumulative effects from a range of topics (i.e. not just air quality effects).

Limitations

5.4.157 Although the methodologies described in this chapter are considered to provide a robust approach to the air quality assessment, there remain inherent uncertainties in certain aspects of the assessment, as would be expected for any predictive modelling study.

5.4.158 These uncertainties include the determination of the background pollutant concentrations for use in the modelling, the input data used to represent the various modelled emission sources (e.g. the numbers and locations of construction plant, machinery and marine vessels, the calculation of road traffic generated by the Wylfa Newydd Project and their distribution on the road network) and also uncertainties and limitations associated with dispersion modelling itself. Conservative approaches have been adopted, where practicable, to take into account these uncertainties, including the following.

- Assuming emissions from the operational combustion plant are constantly at the relevant emission limit values and concentrations adopted for the assessment and using scenarios that contain conservative assumptions on the use of the combustion plant (i.e. modelling sources that would operate infrequently as a continuous emission source).
- Using the maximum predicted concentration from 10 years of meteorological data as a basis of the assessment for non-road traffic emission sources. Predicted concentrations during a typical year would be lower than those reported.
- Assuming no reduction in background concentrations in future years. The background concentrations of some pollutants are likely to decrease in the longer term.
- For non-road traffic emission sources, assuming a worst case scenario that 35% and 70% of the emitted NOx would be in the form of NO_2 for short-term and long-term average concentrations, respectively. The conversion would be expected to be less than these rates over the relatively short distances considered in the assessment, where the highest concentrations are predicted.
- Road traffic emissions during the operational phase are based on the emission factors for the first full year of operation of both Units.

5.4.159 Dispersion models tend to perform better when predicting long-term averaging periods (i.e. annual means) than short-term averaging periods. Statistical relationships are used in the assessment of road traffic emissions to calculate the likelihood of an exceedance of the one-hour mean NO_2 and 24-hour mean PM_{10} AQOs from the long-term (i.e. annual mean) modelling results.

5.4.160 The potential for the uncertainties in the modelling to affect the outcomes of the assessments are discussed in chapter C4 (Application Reference Number: 6.3.4) and D5 (Application Reference Number: 6.4.5) and the uncertainties and worst-case assumptions or approaches are also set out in the modelling reports included as appendix C4-1 (Application Reference Number: 6.3.27), appendix D5-2 (Application Reference Number: 6.4.21) and appendix D5-3 (Application Reference Number: 6.4.22).

5.5 References

Table B5-18 Schedule of references

ID	Reference
RD1	Department for Environment, Food and Rural Affairs. 2007. *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*. London: The Stationery Office.
RD2	Department of Energy and Climate Change. 2011. *Overarching National Policy Statement for Energy (EN-1)*. London: The Stationery Office.
RD3	Department of Energy and Climate Change. 2011. *National Policy Statement for Nuclear Power Generation (EN-6)*. London: The Stationery Office.
RD4	Welsh Government. 2016. Planning Policy Wales (Edition 9). [Online]. [Accessed: November 2016]. Available from: http://gov.wales/docs/desh/publications/161117planning-policy-wales-edition-9-en.pdf.
RD5	Welsh Assembly Government. 2007. *Technical Advice Note 18: Transport*. Cardiff: National Assembly for Wales.
RD6	Welsh Assembly Government. 2009. *Technical Advice Note 5: Nature Conservation and Planning*. Cardiff: National Assembly for Wales.
RD7	Welsh Assembly Government. 2004. *Minerals Planning Policy Wales, Minerals Technical Advice Note (Wales) 1: Aggregates*. Cardiff: National Assembly for Wales.
RD8	Welsh Government. 2017. *Local Air Quality Management in Wales, Policy Guidance PG(W) (17*). June 2017. Cardiff: Welsh Government
RD9	Isle of Anglesey County Council. 2014. New Nuclear Build at Wylfa: Supplementary Planning Guidance. [Online]. [Accessed: August 2016]. Available from: http://www.anglesey.gov.uk/business/energy-island/energy-island-news/new-nuclear-build-at-wylfa-supplementary-planning-guidance/123426.article.
RD10	Isle of Anglesey County Council and Gwynedd Council. 2017. *Anglesey and Gwynedd Joint Local Development Plan 2011 – 2026, Written Statement*. [Online]. [Accessed: August 2017] Available from: http://www.anglesey.gov.uk/planning-and-waste/planning-policy/joint-local-development-plan-anglesey-and-gwynedd/.
RD11	Environmental Protection UK (EPUK)/Institute of Air Quality Management (IAQM). 2017. *Land-Use Planning and Development Control: Planning for Air Quality*. London: Institute of Air Quality Management. Version 1.2
RD12	Institute of Air Quality Management (IAQM). 2016. *IAQM Guidance on the assessment of dust from demolition and construction*. London: Institute of Air Quality Management. Version 1.1

ID	Reference
RD13	Department for Environment, Food and Rural Affairs. 2016. *Local Air Quality Management: Technical Guidance (TG16)*. London: Department for Environment, Food and Rural Affairs.
RD14	Environment Agency. 2016. Air Emissions Risk Assessment for your Environmental Permit. [Online]. [Accessed: August 2017]. Available from: https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit.
RD15	Institute of Air Quality Management (IAQM). 2014. *IAQM Guidance on the assessment of odour for planning*. London: Institute of Air Quality Management.
RD16	Horizon Nuclear Power. 2017. *Wylfa Newydd Project. Air Quality Modelling and Assessment Methodology – Non-Radiological Emissions*. DCRM Ref Number: HNP-S5-PAC-REP-00022. Revision: 2.0.
RD17	Horizon Nuclear Power. 2016. *Existing Nitrogen and Acid Deposition and Critical Loads at Ecological Receptors in the Vicinity of the Wylfa Newydd Development Area*. DCRM Ref Number: WN034-JAC-PAC-MEM-00001. Revision: 1.0.
RD18	Horizon Nuclear Power Ltd. 2016. *Wylfa Newydd Project, Extent of Study Area and Receptor Selection for the Assessment of Air Quality*. DCRM: WN034-JAC-PAC-MEM-00024, Rev 2.0. December 2016.
RD19	Horizon Nuclear Power Ltd. 2016. *Wylfa Newydd Project, Extent of Study Area and Receptor Selection for the Assessment of Air Quality*. DCRM: WN034-JAC-PAC-MEM-00024, Rev 3.0 July 2017.
RD20	Horizon Nuclear Power. 2017. *Wylfa Newydd Project. Sulphur dioxide and ozone concentrations in the vicinity of the Wylfa Newydd Development Area*. DCRM Ref Number: WN034-JAC-PAC-REP-00166. Revision: 2.0.
RD21	Ordnance Survey. 2016. *AddressBase Plus*, © Crown copyright and database rights 2016. Ordnance Survey 100051118.
RD22	Welsh Government. 2016. Available from the Lle A Geo-Portal for Wales [Online]. [Accessed July-December 2016]. Available from: http://lle.gov.wales/home?lang=en.
RD23	Cofnod North Wales Environmental Information Service. 2016. [Online] [Accessed November 2016]. Available from: http://www.cofnod.org.uk/Home.
RD24	Department for Environment, Food and Rural Affairs. 2017. *UK-AIR: Air Information Resource*. *2013-based background maps for NOx, NO_2, PM_{10} and $PM_{2.5}$* [Online]. [Accessed: February 2017]. Available from: https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html
RD25	Department for Environment, Food and Rural Affairs. 2017. *UK-AIR: Air Information Resource*. *2015-based background maps for NOx, NO_2, PM_{10} and*

ID	Reference
	$PM_{2.5}$ [Online]. [Accessed: December 2017]. Available from: https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html
RD26	Department for Environment, Food and Rural Affairs (Defra). 2015. *Air Pollution in the UK 2014*. September 2015. London: Department for Environment, Food and Rural Affairs.
RD27	Department for Environment, Food and Rural Affairs (Defra). 2017. *Air Pollution in the UK 2016*. September 2017. London: Department for Environment, Food and Rural Affairs.
RD28	Isle of Anglesey County Council. 2016. *2016 Air Quality Progress Report for Isle of Anglesey County Council*, Draft Report. Isle of Anglesey County Council, Llangefni. Isle of Anglesey: Isle of Anglesey County Council.
RD29	Air Quality Expert Group. 2007. *Air Quality and Climate Change: A UK Perspective*. London: Department for Environment, Food and Rural Affairs.
RD30	Highways Agency. 2007. *Design Manual for Roads and Bridges* (DMRB). Volume 11: Environmental Assessment, Section 3: Environmental Assessment Techniques, Part 1: HA207/07 Air Quality. London: The Stationery Office.
RD31	Department for Environment, Food and Rural Affairs. 2016. Emission Factor Toolkit (EFT). Version 7. [Online]. [Accessed: August 2016]. Available from: http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html.
RD32	Air Quality Consultants Ltd. 2016. *Emissions of Nitrogen Oxides from Modern Diesel Vehicles*. Air Quality Consultants Ltd: Bristol.
RD33	National Atmospheric Emissions Inventory. 2016. Road Transport Emission Factors: 2014 NAEI. [Online]. [Accessed: May 2017]. Available from: http://naei.defra.gov.uk/data/ef-transport.
RD34	Air Quality Consultants Ltd. 2016. CURED_V2A (the Calculator Using Realistic Emissions for Diesels). [Online]. [Accessed: August 2016]. Available from: http://www.aqconsultants.co.uk/Resources/Download-Reports.aspx.
RD35	Department for Environment, Food and Rural Affairs. 2016. Emission Factor Toolkit (EFT). Version 8.0.1 [Online]. [Accessed: December 2017]. Available from: http://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html.
RD36	Air Quality Consultants Ltd. 2017. *Relationship between CURED V2A and COPERT V5.0*. July 2017, Air Quality Consultants Ltd: Bristol.
RD37	Centre for Ecology and Hydrology. 2017. UK Air Pollution Information System. [Online]. [Accessed: August 2016 – April 2017]. Available from: http://www.apis.ac.uk/.

ID	Reference
RD38	Horizon Nuclear Power. 2015. *Wylfa Newydd Project. A5025 improvements. Environmental Impact Assessment Scoping Report*.
RD39	Horizon Nuclear Power. 2017. *Wylfa Newydd Project. Addendum to the Environmental Impact Assessment Scoping Report*.
RD40	Highways Agency. 2015. Interim Advice Note (IAN) 185/15: Updated traffic, air quality and noise advice on the assessment of link speeds and the generation of vehicle data into 'speed-bands' for users of DMRB Volume 11, Section 3, Part 1 'Air Quality' and Volume 11, Section 3, Part 7 'Noise'. [Online]. [Accessed: May 2017]. Available from: http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian185.pdf.
RD41	Highways Agency. 2012. Interim Advice Note (IAN) 170/12 v3: Updated air quality advice on the assessment of future NOx and NO2 projections for users of DMRB Volume 11, Section 3, Part 1 'Air Quality'. [Online]. [Accessed: May 2017]. Available from: http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian170v3.pdf.
RD42	Highways Agency. 2013. Interim Advice Note (IAN) 174/13: Updated advice for evaluating significant local air quality effects for DMRB Volume 11, Section 3, Part 1 'Air Quality' (HA207/07). [Online]. [Accessed: May 2017]. Available from: http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian174.pdf.
RD43	Department for Environment, Food and Rural Affairs and the Welsh Government. 2016. *Consultation on reducing emissions from Medium Combustion Plants and Generators to improve air quality*. London: Defra, Cardiff: Welsh Government.
RD44	Amec Foster Wheeler. 2016. *Wylfa Newydd Project: Further information on probability of exceedance methodology and effects on ecological receptors*. Document reference Wylfa Technical Note 16456i1.
RD45	Natural Resources Wales. 2017. Email correspondence from Natural Resources Wales to Horizon Nuclear Power, dated 1 March 2017.
RD46	Department for Environment, Food and Rural Affairs. 2016. *Local Air Quality Management Policy Guidance (PG16).* April 2016. Defra: London
RD47	World Health Organisation, Regional Office for Europe, 2013. *Health risks of air pollution in Europe – HRAPIE project, Recommendations for concentration–response functions for cost–benefit analysis of particulate matter, ozone and nitrogen dioxide.* Copenhagen: WHO Regional Office for Europe
RD48	World Health Organization. 2000. *Air Quality Guidelines for Europe*. 2nd Edition. WHO Regional Publications, European Series, No. 91 (CD-ROM Version).

ID	Reference
RD49	Natural Resources Wales (NRW). 2017. Email communication *"RE: Technical Note on ozone and SO_2 concentrations in the vicinity of the Wylfa Newydd site"* 07 April 2017.
RD50	Natural Resources Wales. 2016. Critical Load data provided in email communications with NRW, February 2017.

[This page is intentionally blank]