HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

6.7.5 ES Volume G - A5025 Off-line Highway Improvements G5 - Air quality

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5 Air quality

5.1 Introduction

5.1.1 This chapter describes the assessment of potential air quality effects resulting from the construction and operation of the A5025 Off-line Highway Improvements.

5.1.2 The potential emission sources considered in this chapter include emissions of pollutants from construction plant and machinery and dust emissions. The chapter excludes the air quality effects associated with emissions from road traffic. These are considered in the assessment contained within chapter C4 (air quality effects of traffic) (Application Reference Number: 6.3.4), which covers project-wide effects of road traffic upon air quality.

5.1.3 Please refer to chapter B5 (air quality) (Application Reference Number: 6.2.5) for the technical basis for the assessment including a summary of legislation, policy and guidance; key points arising in consultation that have guided the air quality assessment; and assessment methodologies and criteria.

5.1.4 The chapter is supported by appendix G5-1 (construction dust assessment – A5025 Off-line Highway Improvements) (Application Reference Number: 6.7.17), which is cross-referenced in the text where relevant.

5.2 Study areas

5.2.1 This section describes the study areas relevant to the air quality assessment for the A5025 Off-line Highway Improvements.

5.2.2 The approach for defining the study area is described in chapter B5 (Application Reference Number: 6.2.5). For dust emissions during the construction of the A5025 Off-line Highway Improvements, the assessment of human receptors focuses on areas extending up to 350m from the site boundary (as represented by the Order Limits – see figures G5-1 to G5-3, Application Reference Number: 6.7.48). The site boundary represents the area within which all construction activities would occur for each of the five sections of the A5025 Off-line Highway Improvements (i.e. sections 1, 3, 5 and 7 and the Power Station Access Road Junction). The distance of 350m is based on Institute of Air Quality Management (IAQM) guidance for identifying when an assessment of dust effects is required [RD1]. Potential effects at distances greater than 350m will be less than those effects at locations closer to the site boundary, and any mitigation measures applied to protect sensitive receptors within 350m would help to reduce any possible effects beyond 350m.

5.2.3 The effects of trackout also need to be determined up to 50m from the edge of the local road network within 500m of the A5025 Off-line Highway Improvements site entrance(s). Trackout is defined as the transport of dust or mud from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the road network. In

line with the IAQM guidance [RD1], the assessment also considers relevant ecological receptors up to 50m from the site boundary.

5.2.4 A qualitative assessment of emissions of pollutants from plant and machinery (i.e. Non-road Mobile Machinery) during construction of the A5025 Off-line Highway Improvements has been carried out which considers the potential effects at the nearest receptors based on the scale of the activities. Therefore, it was not necessary to define a specific study area based on a set distance from the site for the assessment of emissions from plant and machinery.

5.3 Baseline environment

5.3.1 This section provides a summary of the baseline conditions for air quality within the study areas described in section 5.2.

5.3.2 The detailed methodology and approach followed to define the baseline is outlined in appendix B5-1 (baseline data synopsis report - air quality, (Application Reference Number: 6.2.18).

Identification of key air quality receptors

5.3.3 This section considers the relevant human and ecological receptors that are within, or close to, the study areas for the assessment of effects on air quality associated with the A5025 Off-line Highway Improvements. These are described for each road section and include both human and ecological receptors, where relevant.

Section 1: Valley

5.3.4 Section 1 is bounded by the community of Valley to the west and an area of flat and low-lying farmland to the east. The A5025 and A5 border the site to the north and south, respectively. The closest residential property is located approximately 30m to the west of the site boundary.

5.3.5 For the assessment of emissions of dust, a receptor count has been carried out for sensitive receptors within 350m of section 1, which identified that there are three commercial properties within 20m and three residential properties, between 20m and 50m from the site boundary. Full details of the receptor count are provided in appendix G5-1 (Application Reference Number: 6.7.17).

5.3.6 The nearest relevant ecological receptors are Gwely Cyrs Caergeiliog, Cae Barcdy and Rhostir a Pwll Caergeiliog Wildlife Sites. The closest, Gwely Cyrs Caergeiliog, is located approximately 150m to the southeast of the site boundary. These sites lie outside the study area of 50m and, therefore, no assessment of dust effects has been undertaken.

5.3.7 Figure G5-1 (Application Reference Number: 6.7.48) shows the location of the human receptors within the study area for section 1. This figure also shows the ecological receptors that are within visible extents of the map. However, as indicated above these are outside of the study area for ecological receptors.

Section 3: Llanfachraeth

5.3.8 Section 3 is bound by the community of Llanfachraeth to the west and isolated farmsteads and residential properties to the east. The existing A5025 carriageway borders the site to the north and south. The closest residential property is located adjacent to the western site boundary in Llanfachraeth.

5.3.9 A receptor count has been carried out for sensitive receptors within 350m of the site boundary, which identified that there are four residential properties within 20m of the site boundary. Full details of the receptor count are provided in appendix G5-1 (Application Reference Number: 6.7.17).

5.3.10 The nearest relevant ecological receptor is Beddmanarch-Cymyran Site of Special Scientific Interest, located approximately 150m to the west of the site boundary. This site lies outside the study area of 50m, and, therefore, no assessment of dust effects has been undertaken.

5.3.11 Figure G5-1 (Application Reference Number: 6.7.48) shows the location of the human receptors within the study area for section 3. This figure also shows ecological receptors that are within the visible extents of the map. However, as indicated above, these are outside of the study area for ecological receptors.

Section 5: Llanfaethlu

5.3.12 Section 5 bypasses the village of Llanfaethlu with several properties and isolated farmsteads to the east and west of the site boundary. The closest residential property is located adjacent to eastern site boundary. The grounds of the new school in Llanfaethlu are approximately 25m from the boundary of the nearest section of the new road, at its closest point. The school buildings and play areas are set back further than this.

5.3.13 A receptor count has been carried out for sensitive receptors within 350m of the site boundary, which identified that there are nine residential properties within 20m of the site boundary. Full details of the receptor count are provided in appendix G5-1 (Application Reference Number: 6.7.17).

5.3.14 The nearest relevant ecological receptors are Llyn Garreg-Lwyd Site of Special Scientific Interest, an ancient semi-natural woodland and Coed Carreglwyd Wildlife Site, located approximately 700m northwest of the site boundary. These sites lie well outside the study area of 50m, and, therefore, no assessment of dust effects has been undertaken.

5.3.15 Figure G5-2 (Application Reference Number: 6.7.48) shows the location of the human receptors within the study area for section 5. This figure also shows ecological receptors that are within the visible extents of the map. However, as indicated above, these are outside of the study area for ecological receptors.

Section 7: Cefn Coch

5.3.16 The section 7 site is bound by the small community of Cefn Coch. The closest residential property in Cefn Coch is located 17m to the east of the

site boundary. Further away from Cefn Coch, the closest isolated property is located approximately 30m to the east of the site boundary.

5.3.17 A receptor count has been carried out for sensitive receptors within 350m of the site boundary, which identified that there is one residential property within 20m of the site boundary (i.e. the property referred to in paragraph 5.3.16). Full details of the receptor count are provided in appendix G5-1 (Application Reference Number: 6.7.17).

5.3.18 An area of ancient woodland is located adjacent to the site boundary and has been assessed for effects of construction dust. Llyn Llygeirian Site of Special Scientific Interest is approximately 300m from the site boundary and is beyond the extent required for inclusion in the assessment. There are no other ecological sites of interest nearby.

5.3.19 Figure G5-2 (Application Reference Number: 6.7.48) shows the location of the human and ecological receptors within the study area for section 7. This figure also shows ecological receptors that are within the visible extents of the map, including those outside of the study area.

Power Station Access Road Junction

5.3.20 The Power Station Access Road Junction is located north of section 7 and is bound predominantly by open farmland, with the A5025 located along its eastern boundary.

5.3.21 A receptor count has been carried out for sensitive receptors within 350m of the site boundary, which identified that there are two residential properties within 100m of the site boundary. The closest receptor is approximately 70m from the road alignment tie-in with the existing A5025, south of the proposed new junction.

5.3.22 The nearest relevant ecological receptor is Cae Gwyn Site of Special Scientific Interest, located approximately 150m to the west of the site boundary. This site lies outside the study area of 50m, and, therefore, no assessment of dust effects has been undertaken.

5.3.23 Figure G5-3 (Application Reference Number: 6.7.48) shows the location of the human receptors within the study area for the Power Station Access Road Junction. This figure also shows ecological receptors that are within the visible extents of the map, including those outside of the study area.

Existing air quality

5.3.24 The review of existing air quality set out in this chapter considers dust deposition, particulate matter (which includes PM_{10} and $PM_{2.5}$[1]), nitrogen dioxide (NO_2), carbon monoxide (CO) and sulphur dioxide (SO_2) as these are the pollutants of concern in relation to construction dust and/or construction plant and machinery.

[1] PM_{10} and $PM_{2.5}$ are particulate matter with an aerodynamic diameter of 10 microns or less and 2.5 microns or less, respectively.

5.3.25 The review of baseline conditions indicates that the existing air quality in the vicinity of the proposed A5025 Off-line Highway Improvements is good and concentrations of air pollutants are generally well within the relevant Air Quality Objectives (AQOs). Through the Local Air Quality Management process [RD2], the Isle of Anglesey County Council (IACC) has not identified any relevant exposure areas where the AQOs are exceeded or could potentially be exceeded in the vicinity of the A5025.

5.3.26 The review of baseline air quality for the Wylfa Newydd Project, including in the vicinity of the A5025 Off-line Highway Improvements, is set out in appendix B5-1 (Application Reference Number: 6.2.18). This appendix also sets out all of the references from which the source data have been derived. The data available for each pollutant to describe the air quality baseline in the vicinity of the proposed A5025 Off-line Highway Improvements are discussed in more detail below.

NO_2 measurements

5.3.27 To characterise the environmental baseline, an air quality monitoring survey was initiated by Horizon with the IACC in February 2016. The survey focused on NO_2 and comprised diffusion tube measurements at roadside locations in the vicinity of the Wylfa Newydd Development Area, Off-Site Power Station Facilities and Associated Development site locations which would experience increases in traffic flows as a result of the Wylfa Newydd Project.

5.3.28 Table G5-1 presents the measured annual mean NO_2 concentrations for the period February 2016 to January 2017 recorded at roadside locations pertinent to the road sections considered within this assessment. The NO_2 monitoring locations are shown in figures G5-1 to G5-3 (Application Reference Number: 6.7.48) and in appendix B5-1 (Application Reference Number: 6.2.18).

Table G5-1Summary of annual mean 2016 NO_2 diffusion tube data

Monitoring location	A5025 road section	Year of measurement	Annual mean concentration ($\mu g/m^3$) [1]
D - A5025 Valley	Section 1	2016	15.3
E - A5025 Llanfachraeth	Section 3	2016	9.9
F - A5025 Llanfaethlu	Section 5	2016	9.5
G - A5025 Cefn Coch	Section 7	2016	7.0
H - A5025 Tregele	Power Station Access Road	2016	10.2

Note 1: $\mu g/m^3$ - Micrograms per cubic metre, the principal unit of measurement for the concentration of an air pollutant in ambient air.

5.3.29 All measurements are below the annual mean AQO ($40\mu g/m^3$), and, therefore, the 1-hour mean AQO is also likely to be met at these locations [RD2]. These measurements are slightly higher than measurements

previously recorded in 2011/2012 and are reported in full in the baseline report (see appendix B5-1, Application Reference Number: 6.2.18).

PM_{10} and $PM_{2.5}$ measurements

5.3.30 The IACC undertook measurements of PM_{10} and $PM_{2.5}$ at the Wylfa Newydd Development Area, approximately 1.3km to the north of the Power Station Access Road Junction, between March 2013 and January 2014. The IACC also carried out monitoring of PM_{10} and $PM_{2.5}$ at a location immediately to the west of the Wylfa Newydd Development Area in 2016. This is approximately 1.5km to the northwest of the Power Station Access Road Junction. The monitoring locations are representative of rural locations on Anglesey, but would also contain some contribution from sea salt particles due to their location close to the northern coast.

5.3.31 The IACC undertakes PM_{10} and $PM_{2.5}$ monitoring at other inland locations including a location at Llynfaes. However, this is located approximately 8km to the east of the A5025 (at its closest point) near to a quarry and is not representative of background conditions adjacent to the A5025. The IACC has also carried out monitoring within the town of Llangefni, approximately 15km east of the A5025 (at its closest point). However, this is an urban background monitoring location and is not likely to be directly representative of the existing conditions at any of the study areas considered in this assessment.

5.3.32 The results of the relevant monitoring locations are provided in table G5-2.

Table G5-2Summary of annual mean PM_{10} and $PM_{2.5}$ monitoring data

Monitoring location	Year of measurement	Annual mean concentration ($\mu g/m^3$)	
		PM_{10}	$PM_{2.5}$
Wylfa Newydd Development Area near Existing Power Station Visitor Centre	2013/2014	14.4	7.8
Felin Cafnan near Wylfa Newydd Development Area	2016	14.9	7.4

5.3.33 Despite the variations in locations across Anglesey and range of location types, the measured average concentrations at all monitoring locations are relatively low and are well within the PM_{10} and $PM_{2.5}$ annual mean AQOs of 40µg/m^3 and 25µg/m^3, respectively.

5.3.34 There were no 24-hour periods where the average PM_{10} concentration was higher than 50µg/m^3 for the 2013/2014 and 2016 surveys (35 exceedances of 50µg/m^3 are allowed by the 24-hour mean AQO).

SO_2 and CO measurements

5.3.35 In common with most local authorities across the UK, no relevant measurements of SO_2 and CO have been undertaken by the IACC.

5.3.36 In general, concentrations of these pollutants are relatively low and are highly unlikely to exceed the AQOs (as set out in chapter B5 (Application Reference Number: 6.2.5)). Most local authorities across the UK do not monitor these pollutants unless there is a specific requirement, such as the presence of a significant industrial source. Concentrations would be expected to be well below the relevant AQOs in the vicinity of the A5025 Off-line Highway Improvements.

Dust deposition data

5.3.37 In 2012, 2013 and 2016, the IACC carried out measurements of dust deposition at several locations in the vicinity of the Wylfa Newydd Development Area and close to the A5025 in Tregele and Cemaes. The measured dust deposition rates ranged from 25.8 to 35.8 milligrams per square metre per day (mg/m^2/day) based on monthly measurements. These were reported by the IACC to be indicative of dust deposition levels for 'open country' and are well below the levels of dust deposition that could possibly affect amenity. Suggested guidelines for the level of dust deposition which may give rise to complaints range from 140mg/m^2/day for open countryside to 200mg/m^2/day for residential areas and outskirts of towns [RD3]. Dust deposition rates above 200mg/m^2/day could also affect sensitive vegetation [RD4]. The value for indicating when complaints are likely, based on site-specific baseline measurement data in the vicinity of the Wylfa Newydd Development Area, would be lower than the 140mg/m^2/day value as the baseline measurements are generally lower than the UK-wide rural dataset. The measurements are also below the levels of dust deposition rates that could potentially affect sensitive vegetation.

5.3.38 The dust deposition measurements recorded in the vicinity of the Wylfa Newydd Development Area and A5025 would be broadly representative of the dust deposition in most rural locations on Anglesey that are not close to specific sources of dust. As there are no significant sources of dust emissions near to the proposed A5025 Off-line Highway Improvements, the dust deposition would be expected to be similar to the low dust deposition rates recorded in the vicinity of the Wylfa Newydd Development Area and A5025.

Background mapping data

5.3.39 The Department for Environment, Food and Rural Affairs and the devolved administrations produce empirically derived background maps of pollutant concentrations. The 2013 background concentrations for oxides of nitrogen (NOx), NO_2, PM_{10} and $PM_{2.5}$ and 2001 background concentrations for SO_2 and CO for the 1km by 1km grid squares representing the A5025 Off-line Highway Improvements study area are presented in table G5-3.

Table G5-3Summary of background map pollutant concentrations for the A5025 Off-line Highway Improvements study area

Pollutant	Annual mean concentration (µg/m^3)
NOx	5.6 – 8.0
NO_2	4.3 – 6.1
PM_{10}	10.1 – 11.0
$PM_{2.5}$	6.8 – 7.5
SO_2	1.5 – 1.9
CO	138 – 144

5.3.40 All mapped background annual mean concentrations presented in table G5-3 are well below the relevant AQOs for the protection of human and ecological receptors. However, the background map annual mean concentrations would generally be representative of concentrations experienced away from pollution sources. For example, annual mean NO_2 concentrations measured close to a road would be higher than the background map annual mean concentration for the same 1km by 1km grid square. This is evidenced in the comparison of the 2013 background map annual mean concentration range of 4.3µg/m^3 to 6.1g/m^3 listed in table G5-3 compared to the range of measured annual mean concentrations of 7.0µg/m^3 to 15.3µg/m^3 recorded by diffusion tubes close to the A5025 (see table G5-1). As there are several human receptors in the vicinity of the Off-line Highways Improvements which are close to the A5025, the measured roadside NO_2 concentrations are considered to be more representative than the background map concentrations. Based on the NO_2 diffusion tube measurement at Cefn Coch, the NOx concentration would be expected to be well within the annual mean AQO of 30µg/m^3 at the ancient woodland located adjacent to the site boundary at section 7.

5.3.41 The background map PM_{10} concentrations are also lower than the measured PM_{10} concentrations recorded at the Wylfa Newydd Development Area (14.4µg/m^3 and 14.9µg/m^3, respectively). Although these measurements are likely to contain some contribution from sea salt particles which could explain the higher concentrations, the background map concentrations are not considered to be representative of existing PM_{10} concentrations at receptors close to the A5025 Off-line Highway Improvements. For $PM_{2.5}$, the background map concentrations are similar to the measured concentrations.

5.3.42 For CO and SO_2, in the absence of monitored data, the background map concentrations are likely to be representative of the background concentrations. These pollutants are not generally associated with road traffic emissions for roads with relatively low traffic flows such as the A5025. Unlike NO_2, the concentrations of these pollutants would be similar to the background concentrations.

Evolution of the air quality baseline

5.3.43 The evolution of baseline air quality is summarised in section 5.4 of chapter B5 (Application Reference Number: 6.2.5) and described in more detail in

appendix B5-1 (Application Reference Number: 6.2.18). This concluded that using existing data to represent the background concentrations of pollutants for the future year assessments was a suitably conservative approach.

5.3.44 The existing concentrations of pollutants at receptors close to the A5025 would be expected to increase due to the additional road traffic associated with the Wylfa Newydd Project. This is assessed within chapter C4 (Application Reference Number: 6.3.4).

Summary

5.3.45 Air quality in the vicinity of the A5025 Off-line Highway Improvements is generally good and measured concentrations of pollutants are well below the relevant AQOs.

5.3.46 The construction dust assessment requires the existing PM_{10} concentration to determine the sensitivity of the area for the assessment of potential human health effects. The highest measured annual mean PM_{10} concentration recorded at, or close to, the Wylfa Newydd Development Area (a concentration of 14.9µg/m^3 to the northwest of the Power Station Access Road Junction) was used to represent PM_{10} concentrations in future years at receptor locations within each of the A5025 Off-line Highway Improvements study areas. In accordance with IAQM methodology [RD1], the contribution from other local sources was also taken into account. In this case, the contribution to the background concentration from road traffic emissions on the A5025, anticipated to occur during the construction phase of the A5025 Off-line Highway Improvements, was included using dispersion modelling. This resulted in a predicted total PM_{10} concentration of between 15.1µg/m^3 and 16.7µg/m^3 at any of the relevant receptors considered as part of the construction dust assessments across all of the A5025 Off-line Highway Improvements sections. Details of the dispersion modelling of road traffic emissions are provided in chapter C4 (Application Reference Number: 6.3.4).

5.4 Design basis and activities

5.4.1 This section sets out the design basis for the assessment of effects. It sets out where any assumptions have been made to enable the assessment to be carried out at this stage in the evolution of the design. This section also identifies the embedded and good practice mitigation that would be adopted to reduce adverse effects as inherent design features or by implementation of standard industry good working practice.

5.4.2 As described in chapter G1 (proposed development) (Application Reference Number: 6.7.1), the application for development consent for the A5025 Off-line Highway Improvements is based on the designs shown on the Works Plans (Application Reference Number: 2.3) within the limits of deviation specified. This chapter has assessed a worst case scenario from an air quality perspective, taking into account the flexibility afforded by the Works Plans (Application Reference Number: 2.3) and limits of deviation described in chapter G1 (Application Reference Number: 6.7.1).

5.4.3 The potential emission sources of air pollutants and dust associated with the construction of the A5025 Off-line Highway Improvements that are considered in this assessment are:

- emissions of pollutants to air from plant and machinery (primarily Non-road Mobile Machinery); and
- dust emissions generated by activities such as earthworks or vehicle movements on dusty surfaces.

5.4.4 As all road traffic-related air quality effects are assessed in chapter C4 (Application Reference Number: 6.3.4), there are no air quality effects associated with the operational phase of the A5025 Off-line Highway Improvements considered in this chapter.

Construction

5.4.5 The design and construction of the A5025 Off-line Highway Improvements would be in accordance with the description provided in chapter G1 (Application Reference Number: 6.7.1) of this volume. The main elements that could affect air quality relate to the emissions of pollutants or dust during the construction of the A5025 Off-line Highway Improvements.

Basis of assessment and assumptions

5.4.6 For dust emissions, the assessment was undertaken on the basis that all activities, as categorised within the IAQM guidance [RD1] (i.e. demolition, earthworks, construction and trackout), take place at the site boundary. This represents a conservative assumption as, in practice, most activities would not take place at the site boundary, increasing the distance between the source and the receptor.

5.4.7 Activities undertaken within designated site compounds (such as stockpiling) have been considered and assessed for each section. There are four proposed compounds (to accommodate the storage of materials, equipment and welfare facilities). The compound area at Cefn Coch will be utilised for the requirements of both section 7 and the Power Station Access Road Junction.

5.4.8 The construction plant and machinery operating on site at the various stages of the construction period are anticipated to consist of a mixture of the following plant types:

- 20 tonne bulldozer;
- 8 and 22 tonne excavators;
- 23 tonne dumper truck;
- 25 tonne grader;
- 18 tonne roller;
- 3 and 12 tonne vibratory rollers;
- macadam laying machine;
- 17 tonne road planer;

- backhoe mounted hydraulic breaker;
- 39 tonne road wagon;
- 55 and 110 tonne mobile cranes (section 3 and 7 only);
- concrete pump and cement mixer truck (section 3 and 7 only);
- hydraulic hammer rig;
- 33 tonne crawler mounted rig (section 3 and 7 only);
- tractor;
- diesel generator (section 3 and 7 only); and
- road sweeper.

5.4.9 An average of eight construction plant items are anticipated to be in operation simultaneously for section 1, section 5 and the Power Station Access Road Junction and an average of 10 construction plant items for section 3 and section 7. The maximum number of plant and machinery in operation at any one time for any of the sections during the construction is estimated to be approximately 16 for section 3 and section 7, and this is expected to occur during the overlap of some of the works (i.e. piling, bulk earthworks formation works and the break-up and removal of the existing road surface).

5.4.10 The location of the plant would normally be spread out over the length of each section. The construction areas are generally long and narrow with the works spread out across different parts of the section. Where there is an overlap in construction activities these would typically be doing different elements of the works (for example plant associated with bulk earthworks would operate in one area to initially prepare the ground for the road carriageway, followed further behind by the plant for road formation works and road surfacing) rather than all plant operating at the same location simultaneously.

5.4.11 The plant number and types were estimated by experienced highway construction engineers based on the proposed construction activities and programme. There is potential for minor variations in the plant types or plant numbers from those presented. However, minor variations in the plant type or number would not affect the outcome of the assessment presented in this chapter.

Embedded mitigation

5.4.12 No embedded mitigation has been identified for air quality as part of the proposed A5025 Off-line Highway Improvements.

Good practice mitigation

5.4.13 The assessment process has identified the good practice mitigation which would be required to control the effects of dust emissions during construction. A suite of good practice mitigation measures recommended by the IAQM guidance [RD1] is set out in section 7 of appendix G5-1 (Application Reference Number: 6.7.17). The relevant and appropriate measures to mitigate dust emissions generated by the construction works

have been taken forward from those set out in appendix G5-1 (Application Reference Number: 6.7.17) to the air quality management strategy within the Wylfa Newydd Code of Construction Practice (CoCP) (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12). A summary of some of the measures is set out below.

- Plan site layout so that machinery and dust-generating activities are located as far as practicable from nearby sensitive receptors.
- Manage earthworks and exposed areas/soil stockpiles to prevent wind whipping using methods such as covering and re-vegetating or other alternative methods of dust suppression, such as water suppression.
- Control site runoff of water or mud.
- Comprehensive measures and working methods to prevent and reduce dust emissions at their source, including but not limited to:
  - where there is a risk of dust nuisance, use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques;
  - ensuring an adequate water supply on the respective A5025 Off-line Highway Improvements site for effective dust/particulate matter suppression/mitigation;
  - using water suppression during demolition activities and on internal site haul roads;
  - where there is a risk of dust nuisance, reducing drop heights from loading shovels, hoppers and other loading or handling equipment during material movement or transfer;
  - ensuring equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable using wet cleaning methods where appropriate;
  - where there is a risk of dust nuisance, enclosing chutes and conveyors and covered skips, where practicable;
  - sheeting of vehicles containing dusty/friable materials when entering and leaving the site; and
  - implementing a wheel wash system (with rumble grids) to reduce trackout.
- Visual inspections of the site and off-site locations, including dust deposition monitoring and PM_{10}/$PM_{2.5}$ monitoring at suitable site boundary locations, to check compliance with dust management procedures and effectiveness of the mitigation measures and dust controls.
- Develop and implement procedures for liaising with stakeholders (including the local community and the IACC), including procedures and protocols for receiving complaints and subsequent investigations and responses.

- Construction workers would be trained as appropriate to increase their awareness of environmental concerns including dust management.

5.4.14 The measures to control dust emissions and monitor the effectiveness of the mitigation are specified within the air quality management strategy in the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12). This has been developed and informed by the measures recommended as part of the IAQM guidance [RD1].

5.4.15 The mitigation considered to represent good practice for the control of emissions from plant and machinery includes the following:

- no idling engines;
- use lower power settings where practicable;
- using mains electricity or battery-powered equipment where practicable to avoid the use of petrol or diesel generators;
- the average emissions across the fleet of relevant Non-road Mobile Machinery would be equivalent to the EU Stage IIIB emission standards (EC Directive 97/68/EC) introduced in January 2011 for the engine sizes relevant to the works; and
- maintenance of construction plant and machinery in accordance with the manufacturers' instructions to reduce the risk of elevated emissions due to poor engine/emissions abatement performance and to ensure that any malfunctions are swiftly repaired.

5.4.16 The mitigation measures to reduce pollutant emissions are included in the air quality management strategy set out within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12).

Operation

5.4.17 Traffic-related air quality effects are assessed in chapter C4 (Application Reference Number: 6.3.4). There are no other potentially significant air quality effects associated with the operation of the A5025 Off-line Highway Improvements.

5.5 Assessment of effects

5.5.1 This section presents the findings of the assessment of air quality effects associated with the construction of the A5025 Off-line Highway Improvements.

Emissions of dust

5.5.2 The assessment of the potential effects from dust emissions during the construction of the A5025 Off-line Highway Improvements is set out in full in appendix G5-1 (Application Reference Number: 6.7.17).

Human receptors

5.5.3 The assessment has identified that there are potentially sensitive dust receptors located near to the A5025 Off-line Highway Improvements. The sensitivity of the area, which takes into consideration the number and distance of receptors from the site and baseline conditions, is summarised as being low sensitivity with respect to emissions of PM_{10} and $PM_{2.5}$ and low to high sensitivity with respect to changes in dust deposition rates for the different sections.

5.5.4 Consideration of the meteorological conditions has identified that there is the potential for dust generated on-site to be blown towards receptors on all sides of the respective A5025 Off-line Highway Improvements sites; receptors located to the east and northeast of where works are undertaken will be downwind more frequently.

5.5.5 The scale of the works has been used to judge the dust emission magnitude for the different types of potential dust generating activities (categorised into demolition earthworks, construction and trackout). Prior to good practice mitigation measures being implemented, these are between small and large dust emission magnitudes for the potential dust generating activities associated with the construction of the A5025 Off-line Highway Improvements.

5.5.6 When combining the sensitivity of the area and the dust emission magnitudes following the IAQM guidance [RD1], the proposed demolition and earthworks activities and trackout associated with the construction of the A5025 Off-line Highway Improvements are predicted to be negligible or low risk for human health effects as there is limited potential for emissions of PM_{10} and $PM_{2.5}$ to increase baseline concentrations to a value that is above the AQO set for the protection for human health. For potential dust soiling effects, there is predicted to be a high risk from earthworks and a medium risk from demolition and trackout as there is the potential for infrequent, short term episodes when baseline dust deposition rates could be increased by an amount that residents could perceive. There is a low risk of construction activities causing significant dust soiling effects.

5.5.7 The dust risks summarised above for each activity were used to identify the recommended level of good practice mitigation and control measures as part of the dust assessment (see appendix G5-1, Application Reference Number: 6.7.17). The proposed mitigation measures to be implemented are set out in the air quality management strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12) and summarised earlier in this chapter. Some measures set out in appendix G5-1 (Application Reference Number: 6.7.17) that are not considered to be applicable or practicable (as the IAQM guidance covers a wide variety of development types and locations) have not been taken forward into the air quality management strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12). Other measures have also been amended to make them specific to the construction activities.

5.5.8 The A5025 Off-line Highway Improvements encompass a large area but are not unusual in scale in comparison with other major infrastructure projects. There are mitigation methods available that have been successfully applied on other similar schemes to manage emissions of dust so that significant off-site effects have not occurred. Such measures are considered to be no more than normal good practice that would be adopted by any contractor meeting the requirements of the air quality management strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12). It is considered that there are no potentially dust generating activities proposed that could not be managed using normal good practices [RD1] so as to prevent significant effects at any off-site receptor, including those located within 20m of the boundary.

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

5.5.10 IAQM guidance [RD1] notes that, with the application of good practice mitigation measures of the type available for use on this project, the environmental effect will not be significant at any off-site receptor. IAQM guidance [RD1] also notes that, even with a rigorous package of mitigation measures in place, such as is proposed in the air quality management strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12), occasional impacts may occur. The air quality management strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12) provides a framework by which the level of mitigation is adapted to respond proactively (such as the use of additional mitigation measures) to the changing risk of dust emissions, so that significant effects are prevented.

5.5.11 Therefore, with the mitigation measures applied as specified in the air quality management strategy within the Wylfa Newydd CoCP (Application Reference Number: 8.6) and A5025 Off-Line Highway Improvements sub-CoCP (Application Reference Number: 8.12), notwithstanding the measures amended or not taken forward from the appendix G5-1 (Application Reference Number: 6.7.17), the likely effect of dust emissions on human health and amenity during construction is concluded to be not significant.

Ecological receptors

5.5.12 The risks of effects of dust during the construction of the A5025 Off-line Highway Improvements at sections 1, 3 and 5 and the Power Station Access Road Junction on relevant ecological receptors were screened out of the assessment as there are no relevant ecological receptors within 50m of the site or within 50m of the access roads up to 500m from the site entrance(s).

5.5.13 For section 7 of the A5025 Off-line Highway Improvements, one ancient woodland was identified within the study area. The dust assessment process identified that, at the woodland, the risk of dust effects was low for earthworks and trackout and negligible for demolition and construction activities.

5.5.14 The dust risks summarised in paragraph 5.5.3 for each activity were used to identify the required level of good practice dust mitigation and control measures as part of the dust assessment (see appendix G5-1, Application Reference Number: 6.7.17) and are summarised in paragraph 5.4.13. The potential dust effects at the ancient woodland would not be significant with these good practice mitigation measures in place.

Emissions from plant and machinery

5.5.15 The IAQM guidance [RD1] specifies the following in relation to the assessment of emissions to air from construction plant and machinery:

"Experience of assessing the exhaust emissions from on-site plant (also known as Non-road Mobile Machinery or NRMM) and site traffic suggests that they are unlikely to make a significant impact on local air quality and, in the vast majority of cases, they will not need to be quantitatively assessed."

5.5.16 Based on the phased construction programme over a period of 18 months, together with the relatively low number and size of plant and machinery items anticipated to operate on-site and spread over the section lengths, the potential effect on local air quality at human and ecological receptors in the vicinity of the A5025 Off-line Highway Improvements would be negligible. On this basis, and in line with the IAQM guidance [RD1], this aspect was screened out from requiring a detailed assessment and the effect on air quality from construction plant and machinery emissions is considered to be not significant.

5.6 Additional mitigation

5.6.1 In accordance with chapter B1 (introduction to the assessment process) (Application Reference Number: 6.2.1), good practice mitigation measures relevant to air quality were taken into account when determining the 'pre-mitigation' significance of effects. These are detailed in the design basis and activities section of this chapter.

5.6.2 As no potentially significant effects have been identified, no additional mitigation measures are proposed.

5.7 Residual effects

5.7.1 This assessment has shown that, taking into account the good practice mitigation, there are no potentially significant effects and there is no requirement for additional mitigation.

5.8 References

Table G5-4 Schedule of references

ID	Reference
RD1	Institute of Air Quality Management. 2016. *Guidance on the Assessment of Dust from Demolition and Construction*. Version 1.1. London: Institute of Air Quality Management.
RD2	Department for Environment, Food and Rural Affairs. 2016. *Local Air Quality Management, Technical Guidance (TG16)*. London: Department for Environment, Food and Rural Affairs.
RD3	Vallack, H. W. and Shillito, D. E. 1998. Suggested guidelines for deposited ambient dust. *Atmospheric Environment*. Vol. 32, No. 16, pp. 2737–2744.
RD4	Environment Agency. 2003. *Assessment of noise disturbance upon birds and dust on vegetation and invertebrate species*. Report Ref. 6502-E.075EA.

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