



Ministry  
of Defence

# **Deep Space Advanced Radar Capability (DARC)**

## **Environmental Statement Volume 3: Appendices**

Draft for Pre-application Consultation  
Planning Application: 22/1136/SO  
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## ES Appendix 6.1: Legislation Policy and Guidance

## ES Appendix 6.1: Legislation Policy and Guidance

### 1. Legislative Framework

- 1.1. The European Directive on Ambient Air Quality (2008/50/EC)<sup>1</sup> sets legally binding limits for ambient concentrations of air pollutants that impact public health such as particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>) and nitrogen dioxide (NO<sub>2</sub>). The Directive and associated pollutant limit values were transposed into UK law under the Air Quality Standards Regulations 2010<sup>2</sup> and, following the UK's exit from the EU, The Environment (Legislative Functions from Directives) (EU Exit) Regulations 2019<sup>3</sup>.
- 1.2. The UK's Air Quality Strategy<sup>4</sup>, published in July 2007, established the framework for air quality improvements across the UK. The strategy sets standards for key air pollutants that reflect levels of pollution thought to avoid or minimise risks to health or ecosystems. The associated air quality objectives (AQOs) are policy targets, expressed as maximum permissible outdoor concentrations of pollutants that take account of economic efficiency, practicability, technical feasibility and timescales.
- 1.3. The national AQOs for the aforementioned key pollutants considered in this assessment are enacted by the Air Quality (Wales) Regulations 2000<sup>5</sup>, as amended in 2002<sup>6</sup>. The national objectives are numerically identical to the European limit values, enacted in Wales through the Air Quality Standards (Wales) Regulations 2010<sup>7</sup>.
- 1.4. Following the departure of the UK from the EU, the Environment Act 2021<sup>8</sup> makes provision about targets, plans, and policies for improving the natural environment, including air quality. The act gives the Secretary of State power to set long-term, legally binding air quality targets of at least 15 years in duration. Long-term targets will be set by regulations subject to the affirmative procedure (requiring a binding vote in both Houses of Parliament).
- 1.5. Under the Environment Act 2021<sup>8</sup> the environment secretary will be required to review the UK Air Quality Strategy at least every five years, and to publish an annual progress report to parliament.
- 1.6. The Environment (Air Quality and Soundscapes) (Wales) Act 2024<sup>9</sup> provides a framework for setting national air quality targets and amending existing legislation relating to the national air quality strategy and local air quality management in Wales.

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1 European Union (2008). Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe OJ L 152, 11.6.2008, pp. 1–44.

2 UK Government (2010). The Air Quality Standards Regulations 2010. [Online] Available at: <https://www.legislation.gov.uk/uksi/2010/1001/contents> [Accessed 22 October 2025].

3 UK Government (2019). The Environment (Legislative Functions from Directives) (EU Exit) Regulations 2019. [Online] Available at: <https://www.legislation.gov.uk/ukdsi/2019/9780111187555/contents> [Accessed 22 October 2025].

4 Department for Environment, Food and Rural Affairs (Defra) (2007). The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

5 Welsh Assembly Government (2000). The Air Quality (Wales) Regulations 2000. [Online] Available at: <https://www.legislation.gov.uk/wsi/2000/1940/contents/made> [Accessed 22 October 2025].

6 Welsh Assembly Government (2000). The Air Quality (Amendment) (Wales) Regulations 2002. [Online] Available at: <https://www.legislation.gov.uk/wsi/2002/3182/made> [Accessed 22 October 2025].

7 UK Government (2010). The Air Quality Standards Regulations 2010. [Online] Available at: <https://www.legislation.gov.uk/uksi/2010/1001/contents> [Accessed 22 October 2025].

8 UK Government (2021). Environment Act 2021. [Online] Available at: <https://www.legislation.gov.uk/ukpga/2021/30/contents> [Accessed 22 October 2025].

9 Welsh Assembly Government (2024). Environment (Air Quality and Soundscapes) (Wales) Act 2024. [Online] Available at: <https://www.legislation.gov.uk/en/asc/2024/2/contents> [Accessed 22 October 2025].

- 1.7. Under Part IV of the Environment Act 1995 (as amended)<sup>10</sup>, local authorities must review and document local air quality within their area by way of staged appraisals and respond accordingly, with the aim of meeting the AQOs defined in the air quality regulations. This is referred to as the Local Air Quality Management (LAQM) regime. The LAQM regime requires that local authorities that identify exceedances of any AQO(s) within their geographical area must designate an Air Quality Management Area(s) (AQMA) and produce an Air Quality Action Plan (AQAP) setting out measures they intend to take to work towards the objectives.

## National and Local Planning Policy

### ***Planning Policy Wales (PPW) 2024***

- 1.8. PPW<sup>11</sup> is the revised National Planning Policy for Wales which is a vital tool in ensuring sustainable development. The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.
- 1.9. A well-functioning planning system is fundamental for sustainable development and achieving sustainable places.
- 1.10. PPW recognises the impacts of air quality on people and ecosystems. The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air pollution on people and the environment.

### ***Welsh Technical Advice Notes***

- 1.11. PPW is supplemented by a series of Technical Advice Notes (TANs). The following TANs are relevant to air quality:
- TAN5- nature conservation and planning<sup>12</sup>; and
  - TAN6- planning for sustainable rural communities<sup>13</sup>.
  - TAN18-transport<sup>14</sup>
- 1.12. The TANs recognise the importance in considering air quality in the planning process.

### ***Pembrokeshire County Council – Local Development Plan***

- 1.13. The Local Development Plan (LDP)<sup>15</sup> for Pembrokeshire was published in 2013. The first review of Pembrokeshire County Council's LDP commenced on 5 May 2017 and will be replaced by LDP2, when published. The Pembrokeshire Coast National Park Authority is currently undertaking a full review of the adopted Local Development Plan 2. A draft Review Report will be available for public consultation in early 2025.

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10 UK Government (1995). Environment Act 1995. [Online] Available at:

<https://www.legislation.gov.uk/ukpga/1995/25/contents> [Accessed 22 October 2025].

11 Welsh Assembly Government (2024). Planning Policy Wales, Edition 12, February 2024.

12 Welsh Assembly Government (2009). Technical Advice Note 5: Nature Conservation and Planning.

13 Welsh Assembly Government (2010). Technical Advice Note 6: Planning for Sustainable Rural Communities.

14 Welsh Assembly Government (2007). Technical Advice Note 18: Transport.

15 Pembrokeshire County Council (2013). Local Development Plan: Planning Pembrokeshire's Future. [Online] Available at: <https://www.pembrokeshire.gov.uk/adopted-local-development-plan> [Accessed 21 October 2025].

- 1.14. The LDP provides a framework of decisions to be made on how land is used and developed. The Plan seeks to develop a network of strong urban and rural communities, with the distribution of new development reasonably balanced between urban and rural areas and directed to settlements in accordance with existing and anticipated infrastructure provision and levels of service provision.

#### ***Clean Air Strategy 2019***

- 1.15. The UK's Clean Air Strategy 2019<sup>16</sup> outlines the approach to tackle air pollution and reduce human health and ecological impacts and boost the economy.
- 1.16. This document builds on an extensive consultation process which indicated broad-based support for many of the actions Defra are proposing. There was also a range of constructive feedback and challenge that has enabled Defra to improve and extend its ambition even further in certain key areas. A document summarising the responses to the consultation is published alongside the strategy.
- 1.17. The final strategy sets out these proposals in detail and indicates how devolved administrations intend to make their share of emissions reductions.

### **Guidance**

#### ***Defra Local Air Management Review and Assessment Technical Guidance (2022)***<sup>17</sup>

- 1.18. Defra has published technical guidance for use by local authorities in their review and assessment work. This guidance, referred to in this document as LAQM.TG22, has been used where appropriate in the assessment presented herein.

#### ***EPUK & IAQM Land-use Planning and Development Control: Planning for Air Quality (2017) v1.2***<sup>18</sup>

- 1.19. This guidance published by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM) offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and the possible mitigation measures that may be implemented to minimise these impacts.

#### ***National Resource Wales (NRW) Assessing air quality impacts as part of your planning application (2025)***<sup>19</sup>.

- 1.20. NRW has provided guidance on what to include in an air quality assessment in support of a planning application and provides a screening criteria for relevant ecological receptors (also referred to in this report as 'protected conservation areas').

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16 UK Government (2019). Clean Air Strategy. [Online] Available <https://www.gov.uk/government/publications/clean-air-strategy-2019> [Accessed 21 October 2025].

17 Department for Environment, Food and Rural Affairs (Defra) (2022). Local Air Quality Management Technical Guidance (TG22). [Online] Available at: <https://laqm.defra.gov.uk/wp-content/uploads/2021/03/LAQM-TG22-May-25-v2.1.pdf> [Accessed 03 November 2025].

18 Environmental Protection UK (EPUK) and IAQM (2017). Land-Use Planning & Development Control: Planning for Air Quality.

19 Natural Resource Wales (2025). Assessing air quality impacts as part of your planning application. [Online] Available at: <https://naturalresources.wales/guidance-and-advice/business-sectors/planning-and-development/advice-for-developers/assessing-air-quality-impacts-as-part-of-your-planning-application/?lang=en> [Accessed 06 November 2025].

***IAQM Guidance on the Assessment of Dust from Demolition and Construction (2024) v2.2<sup>20</sup>***

- 1.21. *Guidance on the Assessment of Dust from Demolition and Construction* published by the IAQM was produced to provide guidance to developers, consultants and environmental health officers on how to assess the potential dust risk arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM<sub>10</sub> impacts on public exposure and impact upon sensitive ecological receptors). The construction dust risk assessment also identifies appropriate mitigation measures such that a potential significant adverse effect will not occur, so the residual effect will normally be ‘not significant’.

***IAQM Guide to the Assessment of Air Quality Impacts on Designated Nature Conservation Sites 2020<sup>21</sup>***

- 1.22. The IAQM have published guidance to assist in the assessment of air quality impacts on designated nature sites in terms of critical levels (i.e. ambient concentrations) and critical loads (i.e. acidic and nutrient nitrogen deposition). The guidance provides assessment criteria and deposition values to as impacts on designated sites.

***Environment Agency Air emissions risk assessment for your environmental permit (2025)<sup>22</sup>***

- 1.23. The Environment Agency guidance provides instruction on how to complete an air emissions risk assessment, including how to calculate the impact of the emissions and the air quality standards to be met. It should be noted the NRW guidance<sup>19</sup> also refers to this guidance when assessing air quality impacts at protected conservation areas.

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20 Institute of Air Quality Management (IAQM) (2024). *Guidance on the assessment of dust from demolition and construction*.

21 Institute of Air Quality Management (IAQM)(2020). *A guide to the assessment of air quality impacts on designated nature conservation sites*.

22 Environment Agency, 2025. *Air emissions risk assessment for your environmental permit*. [Online] Available at: <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit> [Accessed November 2025].



## ES Appendix 6.2: Air Quality Assessment Methodology

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### 1. Construction Dust Risk Assessment Methodology

- 1.1. It is inevitable that with any development, demolition and construction activities would cause some disturbance to those nearby. Dust arising from most construction activities tends to be of a coarse nature, which through dispersion by the wind, can lead to soiling of property including windows, cars, external paintwork and laundry.
- 1.2. The ability of dust particles to remain suspended in the air depends on its shape, size and density. Coarse particles (>30µm) tend to be deposited within 100m of source. Finer particles, between 10-30µm, are generally deposited within 200 to 500m of source, while very fine particles (<10µm) (PM<sub>10</sub>), which remain suspended for longer, can travel up to 1km from source. The greatest proportion of construction dust is made up of coarse particles, thus the majority of dust emissions are deposited within 100m of source.
- 1.3. However, as well as giving rise to annoyance due to soiling of surfaces from dust emissions, there is evidence of major construction activities causing increases in long term PM<sub>10</sub> concentrations and in the number of days exceeding the short term PM<sub>10</sub> objective of 50µg/m<sup>3</sup>. The potential for impacts to occur during the construction of a project must therefore be considered, to ensure appropriate mitigation measures are applied to reduce potential impacts at adjacent receptors. However, it should be noted that disruption due to demolition and construction is a localised phenomenon and is temporary in nature.
- 1.4. During the construction of the proposed development, heavy duty vehicles (HDV) would require access to deliver and remove materials; earthmoving plant and other mobile machinery will work on site and generators and cranes will also be in operation. These machines produce exhaust emissions; of particular concern are emissions of NO<sub>2</sub> and PM<sub>10</sub>.
- 1.5. The assessment of construction impacts has followed the methodology set out within guidance produced by IAQM on assessing impacts from construction activities and is set out below.

### Prediction Method and Approach

- 1.6. In order to assess the potential impacts, the activities on construction sites are divided into four categories. These are:
  - demolition;
  - earthworks;
  - construction; and
  - trackout<sup>23</sup>.
- 1.7. For each activity, the risk of dust annoyance, health and ecological impact is determined using three risk categories: low, medium and high risk. The risk category may be different for each of the four activities. The risk magnitude identified for each of the construction activities is then compared to the number of sensitive receptors in the near vicinity of the 'proposed development' in order to determine the risks posed by the construction activities to these receptors.

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<sup>23</sup> The transport of dust and dirt from the construction site onto the public road network where it may be deposited and then re-suspended by vehicles using the network).

**Step 1: Screen the Need for an Assessment**

- 1.8. The first step is to screen the requirement for a more detailed assessment. An assessment is required where there is:

A 'human receptor' within:

- 250m of the boundary of the application site or
- 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site exit(s); and/or

An 'ecological receptor' within:

- 50m of the boundary of the application site; or
- 50m of the route(s) used by the construction vehicles on the public highway, up to 250m from the site exit(s)

**Step 2A: Define the Potential Dust Emission Magnitude**

- 1.9. This is based on the scale of the anticipated works and the proximity of nearby receptors. The risk is classified as small, medium or large for each of the four categories.

**Demolition:** The potential dust emission classes for demolition are:

- Large: Total building volume  $>75,000\text{m}^3$ , potentially dusty construction material (e.g. Concrete), on site crushing and screening, demolition activities  $>12\text{m}$  above ground level.
- Medium: total building volume  $12,000\text{m}^3 - 75,000\text{m}^3$ , potentially dusty construction material, demolition activities  $6-12\text{m}$  above ground level.
- Small: total building volume  $<12,000\text{m}^3$ , construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities  $<6\text{m}$  above ground, demolition during wetter months.

**Earthworks:** This involves excavating material, haulage, tipping and stockpiling. The potential dust emission classes for earthworks are:

- Large: Total site area  $>110,000\text{m}^2$ , potentially dusty soil type (e.g. clay, which would be prone to suspension when dry due to small particle size),  $>10$  heavy earth moving vehicles active at any one time, formation of bunds  $>6\text{m}$  in height, total material moved  $>100,000$  tonnes.
- Medium: Total site area  $18,000\text{m}^2 - 110,000\text{m}^2$ , moderately dusty soil (e.g. silt), five - ten heavy earth moving vehicles active at any one time, formation of bunds  $3\text{m} - 6\text{m}$  in height.
- Small: Total site area  $<18,000\text{m}^2$ , soil type with large grain size (e.g. sand),  $<5$  heavy earth moving vehicles active at any one time, formation of bunds  $<3\text{m}$  in height.

**Construction:** The important issues when determining the potential dust emission magnitude include the size of the building(s)/infrastructure, method of construction, construction materials, and duration of build. The categories are:

- Large: Total building volume  $>75,000\text{m}^3$ , on site concrete batching, sandblasting.
- Medium: Total building volume  $12,000\text{m}^3 - 75,000\text{m}^3$ , potentially dusty construction material (e.g. concrete), on site concrete batching.

- Small: Total building volume <12,000m<sup>3</sup>, construction material with low potential for dust release (e.g. metal cladding or timber).

1.10. **Trackout:** The risk of impacts occurring during trackout is predominantly dependent on the number of vehicles accessing the Site on a daily basis. However, vehicle size and speed, the duration of activities and local geology are also factors which are used to determine the emission class of the Site as a result of the trackout. The categories are:

- Large: >50 HDV (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100m.
- Medium: 20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content, unpaved road length 50-100m).
- Small: <20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

**Step 2B: Defining the Sensitivity of the Area**

1.11. The sensitivity of the area is defined for dust soiling, human health (PM<sub>10</sub>) and ecological receptors. The sensitivity of the area takes into account the following factors:

- The specific sensitivities of receptors in the area;
- The proximity and number of receptors
- In the case of PM<sub>10</sub>, the local background concentration; and
- Site specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

1.12. Table 1 is used to define the sensitivity of different types of receptors to dust soiling, health effects and ecological effects.

Table 1. Examples of Factors Defining Sensitivity of an Area

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
<b>High</b>	Users can reasonably expect enjoyment of a high level of amenity. The appearance, aesthetics or value of their property would be diminished by soiling. The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. e.g. dwellings, museums and other important collections, medium and long-term car parks and car showrooms.	10 – 100 dwellings within 20m of site. Local PM <sub>10</sub> concentrations close to the objective (e.g. annual mean 36 - 40µg/m <sup>3</sup> ), e.g. residential properties, hospitals, schools and residential care homes.	Locations with an international or national designation and the designated features may be affected by dust soiling. Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red List for Great Britain. e.g. A Special Area of Conservation (SAC).
<b>Medium</b>	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home.	Less than 10 receptors within 20m. Local PM <sub>10</sub> concentrations below the objective (e.g. annual mean 30-36µg/m <sup>3</sup> ).	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown.

Sensitivity of Area	Dust Soiling	Human Receptors	Ecological Receptors
	The appearance, aesthetics or value of their property could be diminished by soiling. The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. e.g. parks and places of work.	e.g. office and shop workers but would generally not include workers occupationally exposed to PM <sub>10</sub> as protection is covered by the Health and Safety at Work legislation	Locations with a national designation where the features may be affected by dust deposition e.g. A Site of Special Scientific Interest (SSSI) with dust sensitive features.
<b>Low</b>	The enjoyment of amenity would not reasonably be expected. Property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling. There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. e.g. playing fields, farmland unless commercially sensitive horticultural, footpaths, short lived car parks and roads.	Locations where human exposure is transient. No receptors within 20m. Local PM <sub>10</sub> concentrations well below the objectives (less than 75%). e.g. public footpaths, playing fields, parks and shopping streets.	Locations with a local designation where the features may be affected by dust deposition. e.g. Local Nature Reserve with dust sensitive features.

1.13. Based on the sensitivities assigned to the different receptors surrounding the proposed development and numbers of receptors within certain distances, a sensitivity classification can be defined for each. Table 2 to Table 4 indicate the criteria used to determine the sensitivity of the area to dust soiling, human health and ecological impacts.

Table 2. Sensitivity of the Area to Dust Soiling on People and Property

Receptor Sensitivity	Number of receptors	Distance from the Source (m)			
		<20	<50	<100	<250
<b>High</b>	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
<b>Medium</b>	>1	Medium	Low	Low	Low
<b>Low</b>	>1	Low	Low	Low	Low

Table 3. Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM <sub>10</sub> Concentrations	Number of Receptors	Distance from the Source (m)			
			<20	<50	<100	<250
High	>32µg/m <sup>3</sup>	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32µg/m <sup>3</sup>	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28µg/m <sup>3</sup>	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24µg/m <sup>3</sup>	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32µg/m <sup>3</sup>	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32µg/m <sup>3</sup>	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28µg/m <sup>3</sup>	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24µg/m <sup>3</sup>	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Table 4. Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

**Step 2C: Define the Risk of Impacts**

- 1.14. The final step is to combine the dust emission magnitude determined in Step 2A with the sensitivity of the area determined in Step 2B to determine the risk of impacts with no mitigation applied. Table 5 to Table 7 indicate the method used to assign the level of risk for each construction activity.
- 1.15. The identified risk of impact is then used to identify appropriate mitigation measures for inclusion within the Construction Environmental Management Plan (CEMP).

Table 5. Risk of Dust Impacts from Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 6. Risk of Dust Impacts from Earthworks/Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 7. Risk of Dust Impacts from Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Negligible
Low	Low Risk	Low Risk	Negligible

## 2. Auxiliary Power Compound Modelling Dispersion Methodology

### AERMOD atmospheric dispersion model software

- 2.1. Operational air quality effects from the proposed auxiliary power compound were assessed using the Lakes Software *AERMOD View* atmospheric dispersion modelling software (Version 13.0.0).

### Validation of AERMOD View

- 2.2. The *AERMOD View* model is widely used and accepted by the local authorities and NRW for undertaking such assessments and its predictions have been validated against real-time monitoring data by the EPA. Model validation studies for AERMOD generally suggest that for the vast majority of cases it is able to predict maximum short term high percentiles concentrations

well within a factor of two; the latest evaluation study for AERMOD<sup>24</sup> shows the composite (geometric mean) ratio of predicted to observed short-term averages from ‘test sites’ (where real-time monitoring data has been undertaken to validate model performance), between 0.96 and 1.2.

## Emissions Parameters

- 2.3. The emissions data used to represent the proposed auxiliary power compound are presented in Table 8.

Table 8. Dispersion modelling parameters

Parameter	Unit	CAT 3516E 50Hz 2600kW (6.5 MWth)	CAT 3516E 50Hz 2600kW (6.5 MWth)	CAT 3512 50Hz 1000kW (2.6 MWth)
Modelled fuel <sup>4</sup>	-	Diesel	Diesel	Diesel
Emission point		GEN1	GEN2	GEN3
Assessed annual operational hours	Hours	180	180	180
Stack location	m	E 185234 N 224767	E 185231 N 224758	E 185228 N 224750
Stack height	m	5.00	5.00	5.00
Stack diameter	m	0.51	0.51	0.51
Flue gas temperature <sup>3</sup>	°C	446	446	448
Calculated efflux velocity	m/s	46.5	46.5	18.6
Moisture content of exhaust gas <sup>2</sup>	%	12	12	10.6
Oxygen content of exhaust gas (dry) <sup>2</sup>	%	9.6	9.6	9.6
Volumetric flow rate (actual) <sup>3</sup>	m <sup>3</sup> /s	9.503	9.503	3.795
Volumetric flow rate (normal) <sup>1</sup>	Nm <sup>3</sup> /s	6.068	6.068	2.457
NOx emission concentration <sup>1,3</sup>	mg/Nm <sup>3</sup>	1,061	1,061	1,312
NOx emission rate	g/s	6.440	6.440	3.224
PM <sub>10</sub> emission concentration <sup>1,3</sup>	mg/Nm <sup>3</sup>	5.8	5.8	5.8
PM <sub>10</sub> emission rate	g/s	0.035	0.035	0.014

Note1: Normalised flows and concentrations presented at 273 K, 101.3 kPa, dry gas and oxygen content of 15%.

24 U.S. Environmental Protection Agency AERMOD Model Formulation and Evaluation EPA-454/R-18-003 (April, 2018).

Note 2: Values applied are based on professional judgment acquired from previous work involving diesel fuelled generators of a similar thermal input capacity.

Note 3: Volumetric flowrate, flue gas temperature and NOx and PM emission concentration provided by the generator manufacturer<sup>25, 26</sup>.

Note 4: The assessed combustion plant is likely to utilise hydrotreated vegetable oil (HVO) or diesel. As a worst-case approach to the assessment, the assessed combustion plant is assumed to operate utilising diesel only.

- 2.4. It should be noted the design of the auxiliary power compound stacks is yet to be finalised and the parameters presented in Table 8 represent the likely stack heights and diameters to be incorporated. The air quality impact assessment will be updated to include the final design stack heights and diameters in order to support the environmental permit application, which is due to be submitted at a later date.

## Buildings

- 2.5. The presence of buildings close to emission sources can significantly affect the dispersion of pollutants by leading to downwash which can result in elevated ground level pollutant concentrations in the wake of a building. All modelled building information is presented in Table 9.

Table 9. Buildings included within the assessment

Building	Co-ordinates bottom left corner		Height (m)	Length (m)	Width (m)	Angle °
	X	Y				
Switchroom	185244	224791	5.66	30.00	5.30	18
Generator housing 1	185236	224766	3.70	17.75	3.22	288
Generator housing 2	185233	224758	3.70	17.75	3.22	288
Generator housing 3	185230	224749	3.70	17.75	3.22	288

## Meteorology

- 2.6. Meteorology can influence the dispersion of air pollutants. The impact of meteorology can vary annually. Therefore, five years of hourly sequential data recorded at Milford Haven meteorological station (2019-2023 inclusive) were used for the assessment. Milford Haven meteorological station, which is approximately 19km southeast of the application site, is considered the closest most representative meteorological monitoring station to the site.

## Terrain

- 2.7. For the modelling of the auxiliary power compound, terrain has been considered within the assessment. Terrain data was added to the *AERMOD View* model to consider the terrain and elevations across the site and the wider study area. The *AERMOD View* model was run to assign elevations to the stacks, buildings and receptors relative to ground levels.

## Conservative Assumptions

- 2.8. The conservative assumptions adopted in this study are summarised below.
- This assessment assumes the proposed auxiliary power compound operate simultaneously and continuously at full load as this approach ensures that the worst-case

25 Caterpillar (CAT) 3516E High Power (HPD) Diesel Generator Sets. LEHE2090-07. 2024.

26 CAT 3512 Diesel Generator Sets. LEHE1243-04. 2022.

or maximum short-term concentrations are quantified. This is an overly conservative approach to the assessment as in practice, the auxiliary power compound will typically operate up to 180 hours per year and are unlikely to operate simultaneously.

- The generators were assumed to operate at maximum load. In practice, the generators may not always operate at maximum load.
- The study is based on emissions being continuously at the emission limits and calculated emissions specified.
- The maximum predicted concentrations at any residential areas were considered for the assessment of short-term and long-term concentrations within the air quality study area. Concentrations at other locations will be less than the maximum values presented.
- The highest predicted concentrations obtained using any of the five different years of meteorological data have been used in this assessment. During a typical year, the ground level concentrations are likely to be lower.
- It was assumed that 100% of the particulate matter emitted from the plant is in the PM<sub>10</sub> size fraction. The actual proportion will be less than 100%.
- It was assumed that 100% of the particulate matter emitted from the plant is in the PM<sub>2.5</sub> size fraction. The actual proportion will be less than 100%.

### 3. Sensitive Receptors

#### Construction

- 3.1. The human receptors within the designated assessment bands around the proposed development boundary are set out in Table 10.

Table 10. Receptor count for the proposed development

Demolition, Earthworks and Construction		Receptor count		
Receptor sensitivity		High	Medium	Low
Distance from the application boundary	<20m	1-10	>1	>1
	<50m	10-100	>1	>1
	<100m	10-100	>1	>1
	<250m	>100	>1	>1
Trackut		Receptor count		
Distance from the potential site exit(s) up to 250m	<20m	1-10	0	0
	<50m	10-100	0	0

- 3.2. There is a parcel of restored ancient woodland (ID 4751) adjacent to the western application site boundary and has been considered in the assessment accordingly. The parcel of ancient woodland has been classed as a Low sensitivity receptor in accordance with IAQM construction dust guidance<sup>20</sup>.

#### Operation

- 3.3. In terms of sensitive receptors in relation to operational phase air quality impacts, Defra's LAQM.TG22 requires the assessment to consider places where members of the public are likely

to be regularly present over the period of time prescribed in the air quality strategy. For instance, on a footpath where exposure will be transient (for the duration of passage along that path) comparison with a short-term standard (i.e. 1 hour mean) may be relevant. At a school or adjacent to a private dwelling, where exposure may be for longer periods, comparison with a long-term standard (such as 24-hour mean or annual mean) will be more appropriate. Box 1.1 of LAQM.TG22 provides examples of the locations where the AQOs should/should not apply.

- 3.4. For this assessment, 59 of the closest and most relevant sensitive human receptors (such as residential properties and Cawdor Barracks accommodation) near the application site were identified for modelling purposes.
- 3.5. In line with Natural Resource Wales guidance<sup>19</sup>, it is necessary to identify European sites (i.e. Special Area of Conservation (SAC), Special Protection Area (SPA) and Ramsar sites), Site of Special Scientific Interest (SSSI), National Nature Reserves (NNR) and Marine Conservation Zones (MCZ) within 2.5km of the assessed combustion plant.
- 3.6. Based on this criteria, St. David's Peninsula Coast SSSI, Ramsey and St David's Peninsula Coast SPA, St David's / Ty Ddewi SAC, Pembrokeshire Marine / Sir Benfro Forol SAC and West Wales Marine / Gorllewin Cymru Forol SAC have been included in the assessment. It should be noted Ramsey and St David's Peninsula Coast SPA and St David's / Ty Ddewi SAC encompass the same geographic area and have been assessed accordingly.
- 3.7. A full list of modelled receptors, including the associated background concentrations, is presented in Table 11 and shown on Figure 6.2 (Air Quality Technical Appendix – Air Quality Assessment Methodology).



Table 11. Modelled Receptors and Background Concentrations

Receptor ref.	Receptor Name / Description	Easting	Northing	Modelled Receptor Height (m)	2019 <sup>1</sup> Annual Mean Background Concentrations (µg/m <sup>3</sup> )			
					NO <sub>x</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
<b>Human receptors</b>								
R1	Llethr, Haverfordwest, SA62 6AX	185402	223602	1.5	n/a	3.7	11.5	6.6
R2	Newgale Lodge, Penycwm, Haverfordwest, SA62 6LA	185737	225034	1.5		3.6	11.1	6.5
R3	Brawdy Farm, Haverfordwest, SA62 6LA	185745	223981	1.5		3.7	11.5	6.6
R4	Erw Lon, Haverfordwest, SA62 6LA	185886	224398	1.5		3.6	11.9	6.7
R5	Hillcroft, Haverfordwest, SA62 6LA	186132	224804	1.5		3.6	11.4	6.5
R6	Penycwm, Haverfordwest, SA62 6LZ	186377	224270	1.5		3.6	11.4	6.5
R7	Haverfordwest, SA62 6JY	187066	224301	1.5		3.6	10.8	6.4
R8	Upper Eweston, Haverfordwest, SA62 6JY	187135	223780	1.5		3.6	11.1	6.5
R9	Trefgam Owen, Haverfordwest, SA62 6NF	186956	224997	1.5		3.6	11.4	6.5
R10	Trefgam Owen, Haverfordwest, SA62 6NF	186709	225515	1.5		3.6	11.0	6.5
R11	Trefgam Owen, Haverfordwest, SA62 6NH	187532	225115	1.5		3.6	11.2	6.5
R12	Trefgam Owen, Haverfordwest, SA62 5PX	187334	225574	1.5		3.6	11.2	6.5
R13	Great Hook, Trefgam Owen, Haverfordwest, SA62 6LB	186882	225975	1.5		3.6	11.0	6.5
R14	Trefgam Owen, Haverfordwest, SA62 6LB	186795	226407	1.5		3.5	11.0	6.4
R15	Lower Vanley, Llandeloy, Haverfordwest, SA62 6LJ	186149	226503	1.5		3.5	11.0	6.4
R16	Haverfordwest, SA62 6LH	186225	227197	1.5		3.5	11.7	6.6
R17	Llandeloy, Haverfordwest, SA62 6LJ	185721	226716	1.5		3.5	10.7	6.4
R18	Haverfordwest, SA62 6LN	185172	226724	1.5		3.5	10.7	6.4



Receptor ref.	Receptor Name / Description	Easting	Northing	Modelled Receptor Height (m)	2019 <sup>1</sup> Annual Mean Background Concentrations (µg/m <sup>3</sup> )			
					NO <sub>x</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
R19	Haverfordwest, SA62 6LN	184871	227053	1.5		3.4	10.9	6.4
R20	Brawdy, Haverfordwest, SA62 6LY	184167	226430	1.5		3.5	10.5	6.3
R21	Brawdy, Haverfordwest, SA62 6LY	183920	226649	1.5		3.5	11.4	6.5
R22	2 Hanwyd Or Hendre, Llandeloy, SA62 6LW	183723	226899	1.5		3.5	11.4	6.5
R23	Curlew Rise, Solva, SA62 6LP	184093	226155	1.5		3.5	10.5	6.3
R24	Paran Chapel, Solva, SA62 6LP	183681	226268	1.5		3.5	11.4	6.5
R25	Birtwick Park, Haverfordwest, SA62 6LR	182315	225369	1.5		3.5	11.1	6.4
R26	Solva, SA62 6LP	183454	225904	1.5		3.5	10.9	6.4
R27	Haverfordwest, SA62 6LY	184709	225382	1.5		3.6	10.8	6.4
R28	Haverfordwest, SA62 6LR	184103	225412	1.5		3.6	10.8	6.4
R29	17 Parc Hall, Haverfordwest, SA62 6LS	183972	225159	1.5		3.5	10.9	6.4
R30	Parc Hall, Haverfordwest, SA62 6AY	184014	224885	1.5		3.7	10.8	6.4
R31	Solva, Haverfordwest, SA62 6LR	183265	225043	1.5		3.5	10.9	6.4
R32	Haverfordwest, SA62 6LW	183736	227188	1.5		3.4	10.9	6.4
R33	Solva, Haverfordwest, SA62 6LR	183089	225479	1.5		3.5	10.9	6.4
R34	Mount Farm, Solva Haverfordwest SA62 6XL	182703	224604	1.5		3.6	10.8	6.4
R35	Haverfordwest, SA62 6BB	184249	223984	1.5		3.8	10.7	6.4
R36	Pointz Castle, Haverfordwest, SA62 6XL	183255	223803	1.5		3.7	10.8	6.4
R37	The Old Post Office, Penycwm, SA62 6AY	184543	223471	1.5		3.8	10.7	6.4
R38	Haverfordwest, SA62 6NP	184465	222890	1.5		3.8	10.2	6.2



Receptor ref.	Receptor Name / Description	Easting	Northing	Modelled Receptor Height (m)	2019 <sup>1</sup> Annual Mean Background Concentrations (µg/m <sup>3</sup> )			
					NO <sub>x</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
R39	Penycwm, Haverfordwest, SA62 6AY	184885	223442	1.5		3.8	10.7	6.4
R40	17 Erw Lon, Haverfordwest, SA62 6AU	185100	223421	1.5		3.7	11.5	6.6
R41	Penycwm, Haverfordwest, SA62 6AT	185008	223217	1.5		3.7	11.5	6.6
R42	Newgale Farm, Newgale, SA62 6AS	185076	222807	1.5		3.7	10.4	6.3
R43	Lochmeyler, SA62 6LL	185536	227495	1.5		3.5	10.9	6.4
R44	Haverfordwest, SA62 6LH	186405	227752	1.5		3.5	11.7	6.6
R45	Treffynnon, Haverfordwest, SA62 5LB	184898	228486	1.5		3.4	10.5	6.3
R46	Trenichol, Haverfordwest, SA62 6LL	184871	227754	1.5		3.4	10.9	6.4
R47	Haverfordwest, SA62 6NB	183936	228089	1.5		3.4	10.9	6.4
R48	Solva, SA62 6NA	183114	227079	1.5		3.4	10.9	6.4
R49	Solva, Haverfordwest, SA62 6LP	182768	226244	1.5		3.5	11.4	6.5
R50	Newgate Hill, Haverfordwest, SA62 6AS	184842	222388	1.5		3.8	10.2	6.2
R51	Barracks accommodation 1	184756	224291	1.5		3.7	10.8	6.4
R52	Barracks accommodation 2	184780	224280	1.5		3.7	10.8	6.4
R53	Barracks accommodation 3	184804	224268	1.5		3.7	10.8	6.4
R56	Barracks accommodation 6	184710	224408	1.5		3.7	10.8	6.4
R57	Barracks accommodation 7	184500	224578	1.5		3.7	10.8	6.4
R58	Barracks accommodation 8	184603	224543	1.5		3.7	10.8	6.4
R59	Barracks accommodation 9	184590	224485	1.5		3.7	10.8	6.4
<b>Protected conservation areas</b>								



Receptor ref.	Receptor Name / Description	Easting	Northing	Modelled Receptor Height (m)	2019 <sup>1</sup> Annual Mean Background Concentrations (µg/m <sup>3</sup> )			
					NO <sub>x</sub>	NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
H1	St David's Peninsula Coast SSSI	184149	223186	0	4.7	n/a		
H2	Ramsey and St David's Peninsula Coast SPA & St David's / Ty Ddewi SAC	184091	223083	0	4.7			
H3	Pembrokshire Marine / Sir Benfro Forol SAC	184069	223017	0	4.7			
H4	West Wales Marine / Gorllewin Cymru Forol SAC	184029	222961	0	4.7			

Note 1: Background concentrations for 2019 have been used as a worst case in line with five meteorological years considered of 2019-2023

### Critical loads

- 3.8. Critical loads for pollutant deposition to statutorily designated habitat sites in the United Kingdom (UK) and for various habitat types have been published by the Centre for Ecology and Hydrology (CEH) and are available from the Air Pollution Information System (APIS) website<sup>27</sup>. Critical Loads are defined on the APIS website<sup>27</sup> 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".*

- 3.9. Compliance with these benchmarks is likely to result in no significant adverse effects on the natural environment at these locations. The *Site Relevant Critical Loads* tool function on the APIS website<sup>27</sup> was used to determine the relevant critical loads.

- 3.10. The critical loads for the designated habitat sites considered in this assessment are set out in Table 12.

Table 12. Critical loads for modelled protected conservation areas

Rec ref	Protected conservation area	Habitat feature applied	Vegetation type (for deposition velocity)	Critical load			
				Acid deposition (kEqH <sup>+</sup> /ha/year)			Nitrogen deposition (kg N/ha/yr) Minimum
				CLMaxS	CLMinN	CLMaxN	
H1	St David's Peninsula Coast SSSI	Arctic, alpine and subalpine scrub habitats	Short	0.390	0.178	0.711	5
		Broadleaved deciduous woodland	Tall	0.834	0.142	1.119	10
H2	Ramsey and St David's Peninsula Coast SPA & St David's / Ty Ddewi SAC	Dry heaths	Short	4.000	0.856	4.856	5
H3	Pembrokshire Marine / Sir Benfro Forol SAC	Moist and wet dune slacks	Short	No critical load data available			5
H4	West Wales Marine / Gorllewin Cymru Forol SAC	Species' broad habitat not sensitive to eutrophication		No critical load data available			

- 3.11. Critical load functions for acid deposition are specified on the basis of both nitrogen and sulphur derived acid. The critical load function contains a value for sulphur derived acid and two values for nitrogen derived acid deposition (a minimum and maximum value). The APIS website provides advice on how to calculate the process contribution (PC) (i.e. emissions from the modelled process alone) and the predicted environmental concentration (PEC) (i.e. the PC added to the existing deposition) as a percentage of the acid critical load function and how to determine exceedances of the critical load function. This guidance was adopted for this assessment. The

<sup>27</sup> CEH (2025). APIS - Air Pollution Information System. [Online] Available at: <https://www.apis.ac.uk/> [Accessed 06 November 2025].

minimum of the range of nitrogen critical loads was used for the assessment in line with the advice on the APIS website<sup>27</sup>.

- 3.12. Existing acid and nutrient nitrogen deposition levels were also obtained from APIS<sup>27</sup>. As a conservative approach to the assessment, it is assumed the most sensitive vegetation type selected is present at the specific modelled location within the assessed protected conservation area. The existing deposition values at the assessed ecological designations are set out in Table 13.

Table 13. Existing deposition at modelled habitat sites

Rec ref	Protected conservation area	Vegetation type (for deposition velocity)	Existing deposition rates	
			Existing acid deposition (kEqH+/ha/year)	Existing nutrient N deposition (kg N/ha/year)
			Nitrogen and sulphur	Nitrogen
H1	St David's Peninsula Coast SSSI	Short	0.88	11.30
		Tall	1.57	20.20
H2	Ramsey and St David's Peninsula Coast SPA & St David's / Ty Ddewi SAC	Short	0.88	11.30
H3	Pembrokshire Marine / Sir Benfro Forol SAC	Short	0.88	11.10
H4	West Wales Marine / Gorllewin Cymru Forol SAC	Short	-	-

## 4. NO<sub>x</sub> to NO<sub>2</sub> Conversion

- 4.1. The conversion from NO<sub>x</sub> to NO<sub>2</sub> is dependent on chemical reactions in the atmosphere dependant on ozone and temperature.
- 4.2. A conversion factor that converts the predicted NO<sub>x</sub> concentrations to NO<sub>2</sub> concentrations has been used, following guidance published by the England and Wales Environment Agency<sup>28</sup> on the conversion ratio for NO<sub>x</sub> to NO<sub>2</sub>. This assumes a worst-case conversion ratio of 70% of NO<sub>x</sub> as NO<sub>2</sub> in relation to long term (annual mean) impacts and 35% of NO<sub>x</sub> as NO<sub>2</sub> in relation to short-term (1-hour mean) impacts. This is a risk-based approach that is also in line with USEPA tiered methodology<sup>29</sup> for NO<sub>x</sub> to NO<sub>2</sub> conversion and therefore is a conservative approach and worst case.

<sup>28</sup> Please see for more information:

[https://webarchive.nationalarchives.gov.uk/ukgwa/20140328084622/http://www.environment-agency.gov.uk/static/documents/Business/noxno2conv2005\\_1233043.pdf](https://webarchive.nationalarchives.gov.uk/ukgwa/20140328084622/http://www.environment-agency.gov.uk/static/documents/Business/noxno2conv2005_1233043.pdf).

<sup>29</sup> Tiered approach for NO<sub>x</sub> to NO<sub>2</sub> conversion

[https://webarchive.nationalarchives.gov.uk/ukgwa/20140328084622/http://www.environment-agency.gov.uk/static/documents/Business/noxno2conv2005\\_1233043.pdf](https://webarchive.nationalarchives.gov.uk/ukgwa/20140328084622/http://www.environment-agency.gov.uk/static/documents/Business/noxno2conv2005_1233043.pdf).

## 5. Annual Mean Concentrations (including background)

- 5.1. Total pollutant concentrations were calculated based on summing the auxiliary power compound PC to the respective background pollutant concentration. For short-term averaging periods, the background concentration was assumed to be double the respective annual mean. Background concentrations for 2019 have been used as a worst case in line with five meteorological years considered of 2019-2023.

## 6. Assessment Significance Criteria

### Human receptors

- 6.1. For the assessment of long-term average concentrations (i.e. the annual mean concentrations) at human receptors, impacts were described using the following criteria:
- if the PC is less than 1% of the long-term EQS, the contribution can be considered as 'insignificant' and not representative of a significant effect (i.e. not significant)<sup>30</sup>;
  - if the PC is greater than 1% of the EQS but the PEC is less than 70% of the long-term air EQS, based on professional judgement, this would be classed as 'not significant'; and
  - where the PC is greater than 1% of the EQS and the PEC is greater than 70% of the EQS, professional judgement is used to determine the overall significance of the effect (i.e. whether the effect would be 'not significant' or 'significant'), taking account of the following:
    - the scale of the changes in concentrations;
    - whether or not an exceedance of an EQS is predicted to arise in the study area where none existed before, or an exceedance in the study area is substantially increased as a result of the development; and
    - uncertainty, including the influence and validity of any assumptions adopted in undertaking the assessment.
- 6.2. For the assessment of short-term average concentrations (e.g. the 24-hour mean PM<sub>10</sub> and 1-hour mean NO<sub>2</sub> concentrations), impacts were described using the following criteria:
- if the PC is less than 10% of the short-term EQS, this would be classed as 'insignificant' and not representative of a significant effect (i.e. not significant) (Ref. A7.3);
  - if the PC is greater than 10% of the EQS but less than 20% of the headroom between the short-term background concentration and the EQS, based on professional judgement, this can also be described as not significant; and
  - where the PC is greater than 10% of the EQS and 20% of the headroom, professional judgement is used to determine the overall significance of the effect (i.e. whether the effect would be 'not significant' or 'significant') in line with the approach specified above for long-term average concentrations.
- 6.3. Furthermore, impacts on air quality, whether adverse or beneficial, may have an effect on human health that can be judged as 'significant' or 'not significant'. An impact is the change in the concentration of an air pollutant, as experienced by a receptor as the result of a proposed development. This may have an effect on the health of a sensitive receptor, depending on the severity of the impact and other factors such as the air quality in the area surrounding the

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30 Environment Agency, 2025. Air emissions risk assessment for your environmental permit. [Online] Available at: <https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit> [Accessed November 2025].

proposed development, that may need to be taken into account. Judging the severity of an impact is generally easier than judging the significance of an effect.

- 6.4. Table 14 presents impact descriptors, which provide the level of severity of an impact and help inform the judgment of significance for changes to long term predicted concentrations, as outlined within IAQM and EPUK air quality planning guidance.

Table 14. Impact descriptors for changes in annual mean concentrations of pollutants considered

Long-term average concentration at receptor in assessment year <sup>1</sup>	% Change in concentration relative to Environmental Quality Standard (EQS) <sup>2</sup>			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% or less of AQAL	Negligible	Slight	Moderate	Moderate
95-102% or less of AQAL	Slight	Moderate	Moderate	Substantial
103-109% or less of AQAL	Moderate	Moderate	Substantial	Substantial
110% or less of AQAL	Moderate	Substantial	Substantial	Substantial

Note 1: Table 13 is only designed to be used with annual mean concentrations.

Note 2: Referred to in the EPUK and IAQM planning guidance as Air Quality Assessment Level (AQAL), which refers to an AQO, EU limit or target value, or an Environmental Assessment Level (EAL). For the purposes of reporting, collectively termed as Environmental Quality Standards (EQSs).

- 6.5. The predicted percentage change is rounded to a whole number, so it is clear which category the impact falls within, so a change of 0.5% is considered as 1%. Changes of 0%, i.e. less than 0.5% are described as negligible.
- 6.6. For point emission sources, such as those considered in this assessment, consideration should also be given to short term average concentrations (e.g. concentrations which are averaged over the period of 1-hour). The guidance recommends the use of the Environment Agency threshold criterion of 10% of the short-term EQS for identifying emissions<sup>30</sup> which are negligible and would have an insignificant effect. The EPUK and IAQM air quality planning guidance recommends that, for determining the severity of an impact for short-term concentrations, the background concentrations are less critical as any peak concentrations from the modelled emission sources are not directly additive to the background concentrations. The guidance provides a method for assigning a magnitude of change and also how this relates to an impact descriptor. This approach has been applied to the modelling of short-term concentrations and is shown in
- 6.7. Table 15.

Table 15. Severity of impact based on magnitude associated with short-term peak concentrations of pollutants

% Change in concentration relative to Environmental Quality Standard (EQS) <sup>2</sup>			
<10% (Negligible)	10-20% (Small)	>20-50% (Medium)	>50% (Large)
Negligible	Slight	Moderate	Substantial

- 6.8. The above framework for describing the impacts was used as the initial basis for making a judgment on the overall significance of the effects of air quality at human receptors. A professional judgment was made using the EPUK and IAQM air quality planning guidance which states that the reasons for reaching the conclusions on significance should be transparent and set out logically. The judgement included consideration of the following:

- the description of the impacts at the receptors and number of properties affected by slight, moderate or substantial air quality impacts and a judgment on the overall balance (i.e. it will be more straightforward to conclude that an effect is 'not significant' if all the impacts are described as 'negligible');
- whether or not an exceedance of an air quality objective is predicted to arise in the study area where none existed before or an exceedance area is substantially increased as a result of the development; and
- uncertainty, including the influence and validity of any assumptions adopted in undertaking the assessment.

### Protected conservation areas

- 6.9. With regard to concentrations at the assessed designated habitat site, emissions can be described as 'insignificant' and no further assessment is required (including the need to calculate PECs) if:
- the short-term PC is less than 10% of the short-term environmental standard for protected conservation areas (Environment Agency guidance<sup>22</sup>); or
  - the long-term PC is less than 1% of the long-term environmental standard for protected conservation areas (NRW guidance<sup>19</sup>).
- 6.10. Where appropriate, the significance of the predicted long-term (annual mean) concentrations or deposition at protected conservation areas were determined in line with Environment Agency guidance<sup>22</sup> summarised as follows:
- 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 rates 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 as appropriate, the emission is not likely 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.
- 6.11. 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.
- 6.12. For short-term mean concentrations (i.e. the 24-hour mean critical level for NO<sub>x</sub>) where the PC is less than 10% of the critical level then 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. Further consideration is likely to be required in this situation.



## ES Appendix 6.3: Impact Assessment Results

## ES Appendix 6.3: Impact Assessment Results

### 1. Construction Dust Risk Assessment

#### Application Site and Surrounding Area

- 1.1. The area surrounding the application site is predominantly rural in nature with sporadic residential properties in close proximity to the application site boundary. Army personnel housed on-site in the Cawdor Barracks are scheduled to leave in 2028 with construction of the proposed development being completed in 2029. For the purposes of this assessment, and to ensure a precautionary approach, the presence of Army personnel has been considered during the entire construction period. This ensures that potential air quality impacts on sensitive human receptors are fully assessed, regardless of the exact timing of their departure.
- 1.2. As discussed in Chapter 6 (Air Quality), the PM<sub>10</sub> concentrations in the vicinity of the proposed development are likely to be below the relevant EQS.
- 1.3. This assessment was undertaken on the basis that all dust generating activities would take place at the edge of the works boundary. This represents a conservative assumption, as in practice most activities would not take place at the boundary, thus increasing the distance between the source and the receptor.

#### Risk Assessment of Dust Impacts

##### *Potential Dust Emission Magnitude*

- 1.4. The dust emission magnitude is based on the scale of anticipated works at the Site and has been classified as small, medium or large for each of the four dust generating activities; demolition, earthworks, construction and trackout.
- 1.5. The dust emission magnitude of each activity has been specified using the definitions of dust emission magnitudes presented in Appendix 6.2 (Air Quality Assessment Methodology) and professional judgement, in line with IAQM guidance (see Section 7.2 of the IAQM construction dust guidance).

##### *Demolition*

- 1.6. There will be very limited demolition activities associated with the construction of the proposed development. These activities, which will be limited to the runway and taxiway, will include the removal of small sections of some antenna foundations and two sections associated with the operational and spares buildings (approximately 400m<sup>2</sup> each). The total volume of demolition is likely to be less than 12,000m<sup>3</sup>. On this basis, the assessment of demolition is based on a dust emission class of **‘small’**.

##### *Earthworks*

- 1.7. Earthworks activities associated with the proposed development would include excavation and site levelling to facilitate construction. As a conservative approach, it is assumed there could potentially be between 5 and 10 heavy earth-moving equipment in operation at any one time (comprising excavators and dumper trucks). It is estimated that the total site area for earthworks is approximately 20,000m<sup>2</sup>. On this basis, the assessment of earthworks is based on a dust emission class of **‘medium’**.

### Construction

- 1.8. Based on the current design layout, the total building volume for the proposed development is estimated to be between 12,000m<sup>3</sup> and 75,000m<sup>3</sup>. Potentially dusty construction materials (e.g. concrete) will be utilised, and concrete batching will be carried out off-site. On this basis, the assessment of construction is based on a dust emission class of **'medium'**.

### Trackout

- 1.9. Based on the anticipated scale of activities, the maximum number of daily outward movements of HDVs onto the public road network is anticipated to be less than 20 in any one day. Furthermore, with exception of site egress at crash gate 21, on-site haul routes will utilise the existing runways and taxiways prior to leaving the site. On this basis, the assessment of trackout is based on a dust emission class of **'small'**.

### Summary

- 1.10. The dust emission magnitudes for each activity are shown in Table 16 below.

Table 16. Summary of Dust Emission Magnitude for Each Activity

Source	Magnitude
Demolition	Small
Earthworks	Medium
Construction	Medium
Trackout	Small

### Sensitivity of the Area

- 1.11. The sensitivity of the surrounding area takes into account the following factors:
- The specific sensitivities of receptors in the area;
  - The proximity and number of those receptors;
  - In the case of PM<sub>10</sub>, the local background concentrations; and
  - Site-specific factors i.e. whether there are natural shelters such as trees, to reduce the risk of wind-blown dust.
- 1.12. Based on the IAQM construction dust guidance<sup>20</sup>, residential dwellings are considered as 'High' sensitivity receptors in relation to both dust soiling and health effects of PM<sub>10</sub>.
- 1.13. The distance screening bands (20m, 50m etc) for the identification of sensitive receptors as published by IAQM have been used. It has been estimated that there are between 1 and 10 high sensitivity receptors within 20m of the application site boundary, owing to residential properties in the surrounding area (see Table 10) (including on-site accommodation). As a result, the sensitivity of the surrounding area is considered to be **'Medium'** in relation to dust soiling effects on people and property from the demolition, earthworks and construction activities.
- 1.14. It should be noted the temporary construction access is likely to be located on the C3010, approximately 0.9km north of the junction of the C3010 with the A487 at Penycwm. As there are no sensitive human receptors within 20m of the construction route up to 250m from the potential site exit, trackout has not been considered further in the assessment.

- 1.15. The Defra estimated background PM<sub>10</sub> concentration for 2019 at the application site is 11.9 µg/m<sup>3</sup>. Based on the number of the receptors within the site boundary and the local concentrations of PM<sub>10</sub>, the sensitivity of the surrounding area is considered to be 'Low' with regards to human health impacts.
- 1.16. The resulting sensitivity of receptors in the surround areas is summarised in Table 17 below.

Table 17. Sensitivity Summary

Receptor	Potential Impact	Sensitivity at Site
Dust Soiling	Receptor sensitivity	High
	Number of receptors	Between 1-10 within 20m of the application site boundary (including on-site accommodation)
	Sensitivity of the area	Medium
Human Health	Receptor sensitivity	High
	Annual mean PM <sub>10</sub> concentration	<24µg/m <sup>3</sup>
	Number of receptors	Between 1-10 within 20m of the application site boundary (including on-site accommodation)
	Sensitivity of the area	Low

- 1.17. As discussed in Section 3, there is a parcel of restored ancient woodland adjacent to the western application site boundary and has been considered in the assessment accordingly. The parcel of ancient woodland has been classed as a Low sensitivity receptor for all relevant dust generating activities in accordance with IAQM construction dust guidance<sup>20</sup>.

Table 18. Summary of Sensitivity of Surrounding Area

Potential Impact	Sensitivity of Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium	Medium	Medium	n/a
Human Health	Low	Low	Low	
Ecological	Low	Low	Low	

## Defining the Risk of Impacts

- 1.18. The dust emission magnitude (as set out in Table 16) is combined with the sensitivity of the area (see Table 18) to determine the risk of dust soiling, human health and ecological impacts, assuming no mitigation measures applied at application site.

The risk of impacts associated with each activity are provided in

- 1.19. Table 19 below and have been used to identify site-specific mitigation measures, which are set out in Technical ES Appendix 6.4 (Air Quality Technical Appendix – Air Quality Mitigation).

Table 19. Summary of Risk Effects to Define Site Specific Mitigation

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

- 1.20. For dust soiling impacts, there is predicted to be a **Low risk** from demolition activities and a **Medium risk** from earthworks and construction activities.
- 1.21. For human health and ecological impacts, there is predicted to be a **Negligible to Low risk** from all relevant dust generating activities.
- 1.22. Therefore, it would be necessary to adopt an appropriate level of good practice mitigation to reduce the risks of causing a significant effect to nearby human and ecological receptors. The mitigation measures, as recommended by the IAQM construction dust guidance<sup>20</sup> and taken forward from this assessment, would prevent or reduce potential nuisance dust or PM<sub>10</sub> (and PM<sub>2.5</sub>) emissions, which are associated with health impacts, such as exacerbating existing human health conditions, including asthma and other lung conditions.
- 1.23. Measures such as those specified in the IAQM construction dust guidance<sup>20</sup> would normally be sufficient to reduce construction dust nuisance and risks to human health and ecological receptors to a ‘not significant’ effect.
- 1.24. The full list of recommended measures is provided in Tables 23 to Table 27 in Appendix 6.4 (Air Quality Technical Appendix – Air Quality Mitigation). The measures to control dust emissions taken forward from this assessment, derived from the highly recommended or desirable measures and the monitoring of the effectiveness of the mitigation, would be included in the air quality management strategies set out in the CEMP.

## 2. Assessment of Auxiliary Power Compound Emissions

- 2.1. The dispersion modelling was completed based on five years of hourly sequential meteorological data. The results presented herein for each pollutant represent the maximum modelled impacts from the five years of data modelled.
- 2.2. To provide a robust assessment, a worst-case operating scenario has been modelled with 180 hours of operation per annum for each assessed generator. This operating scenario could comprise of either of the following:
- Testing and maintenance operation scenario: Testing of each generator simultaneously at full load for up to 1-hour at any one time on a monthly basis. This would equate to 12 hours of testing per annum for each generator.
  - Emergency operation scenario: All generators operating at full load simultaneously for a maximum consecutive period of 168 hours (7days).

- 2.3. Based on the planned testing and maintenance of up to 12 hours per annum per generator and emergency operation of up to 168 hours, the assessment has assumed worst case of 180 hours of operation for long-term (i.e. annual mean) predicted modelled concentrations. For short-term predicted modelled concentrations, it is assumed the assessed combustion plant operate continuously as this approach ensures that the worst-case or maximum short-term concentrations are quantified.
- 2.4. For completeness the modelling results are compared against the EQS to demonstrate if all objective values are complied with.
- 2.5. The results presented below are the maximum modelled concentrations predicted at any of the 59 assessed sensitive human receptor locations and five assessed protected conservation areas for the five years of meteorological data used in the study.
- 2.6. The results of the dispersion modelling are set out in Table 20, which presents the following information:
- Environmental Quality Standard (EQS)<sup>31</sup> (i.e. the relevant air quality standard);
  - estimated annual mean background concentration (see Table 11) that is representative of the baseline;
  - PC, the maximum modelled concentrations due to the emissions from the assessed combustion plant;
  - PEC, the maximum modelled concentration due to process emissions combined with estimated baseline concentrations; and
  - PC and PEC as a percentage of the EQS.

## Human receptors

The results of the detailed assessment at sensitive human receptor locations are presented in Table 20.

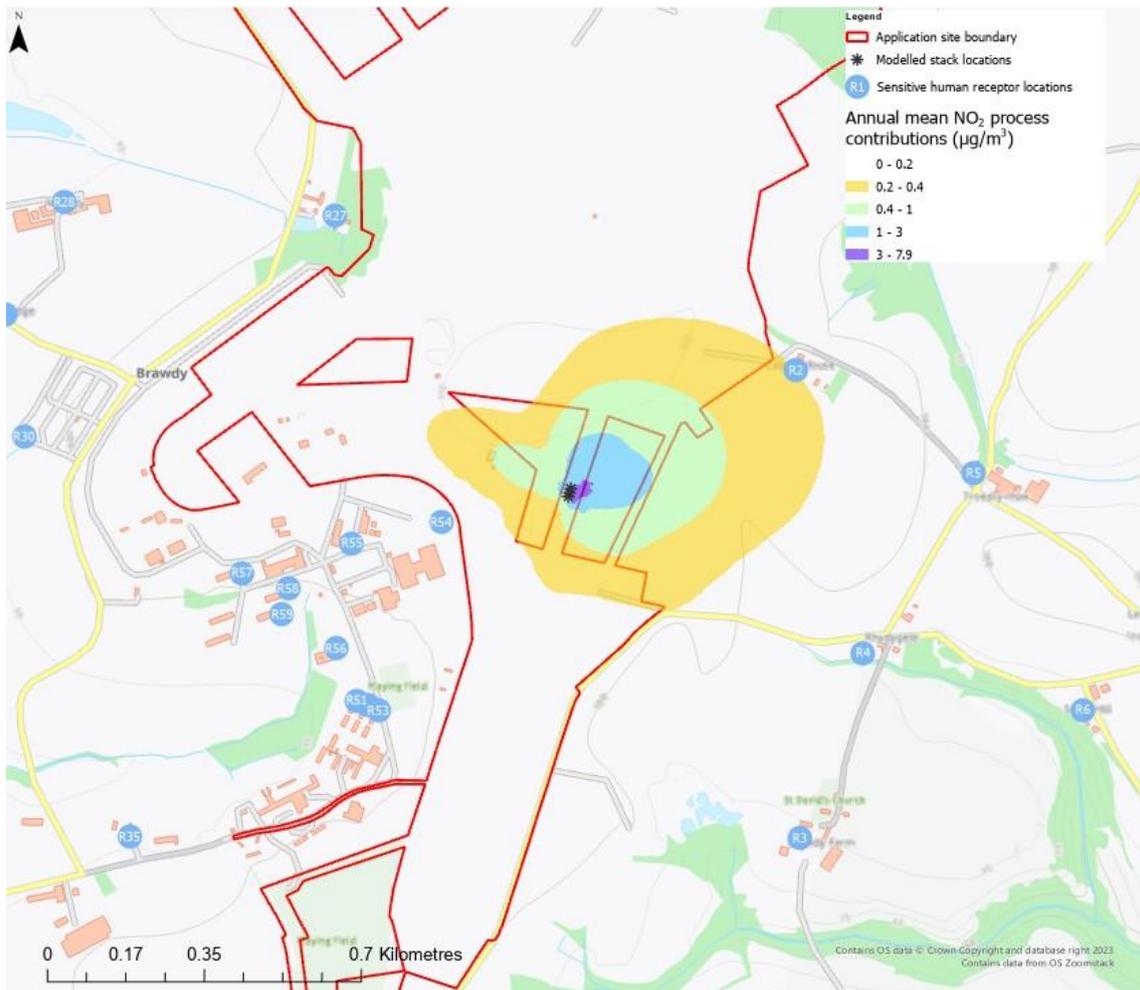
Table 20. Results of detailed assessment at human receptor locations

Pollutant	Averaging period	Receptor where maximum PC predicted	EQS ( $\mu\text{g}/\text{m}^3$ )	Baseline air quality level ( $\mu\text{g}/\text{m}^3$ )	PC ( $\mu\text{g}/\text{m}^3$ )	PEC ( $\mu\text{g}/\text{m}^3$ )	PC/EQS (%)	PEC/EQS (%)
NO <sub>2</sub>	Annual mean	R2	40	3.6	0.2	3.8	0.5%	9.4%
	1-hour mean (99.79 <sup>th</sup> percentile)	R54	200	7.4	127.2	134.6	63.6%	67.3%
PM <sub>10</sub>	Annual mean	R2	40	11.1	1.46E-03	11.1	0.004%	27.8%
	24-hour mean (90.41 <sup>st</sup> percentile)	R2	50	22.2	0.2	22.5	0.4%	44.9%
PM <sub>2.5</sub>	Annual mean	R2	25	6.5	1.46E-03	6.5	0.01%	25.9%

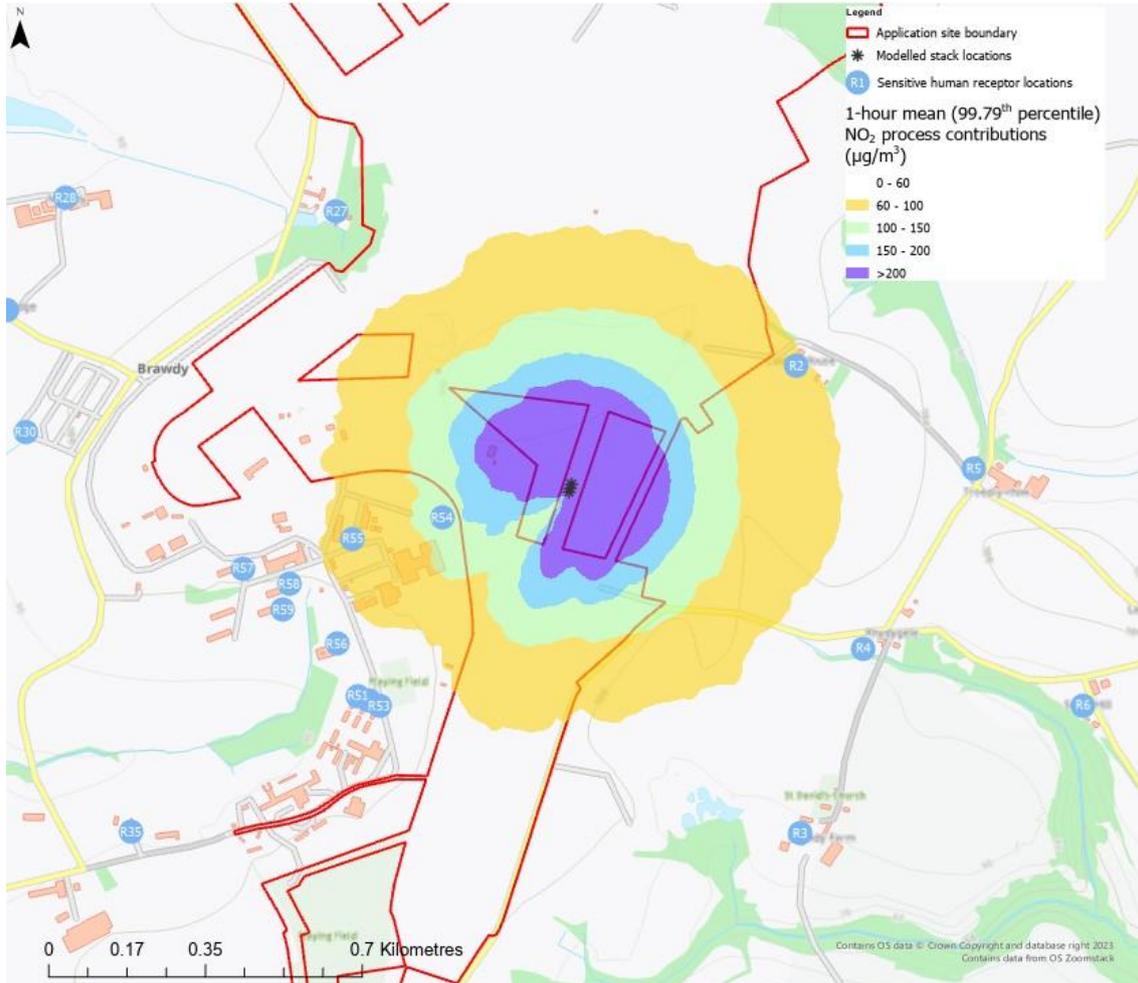
<sup>31</sup> For the purposes of reporting, the AQOs have been collectively termed as EQSs.

- 2.7. The results in Table 20 indicate that the predicted concentrations at sensitive human receptors do not exceed any relevant long-term or short-term EQS.
- 2.8. For annual mean NO<sub>2</sub>, PM<sub>10</sub>, PM<sub>2.5</sub> concentrations, the respective PCs are less than 1% of the relevant long-term EQS and the impacts are considered '**insignificant**' as per Environment Agency guidance<sup>30</sup>. The highest annual mean PCs are predicted to occur at R2, which represents a residential property approximately 0.6km east-northeast of the auxiliary power compound stacks.
- 2.9. As per the EPUK & IAQM planning guidance, the percentage change in concentration relative to the EQS means the impact is considered '**negligible adverse**' when operating the auxiliary power compound.
- 2.10. For short-term PM<sub>10</sub> concentrations, the PC is less than 10% of the relevant EQS and the impacts are considered '**insignificant**' as per Environment Agency guidance<sup>30</sup>. As per the EPUK & IAQM planning guidance, the percentage change in concentration relative to the EQS means the impact is also considered '**negligible adverse**'. The highest PC is predicted to occur at R2.
- 2.11. For short-term NO<sub>2</sub> concentrations, the PC is above 10% of the relevant EQS (i.e. 63.6%). However, the corresponding PEC is less than 70% of the relevant EQS and the impacts are considered '**not significant**'. The highest PC is predicted to occur at R54, which represents Barracks Accommodation 4 approximately 0.3km west-southwest of the auxiliary power compound stacks.
- 2.12. It is noted that although no exceedances are predicted, short-term NO<sub>2</sub> concentrations are elevated. For short-term predicted modelled concentrations, this assessment assumes the auxiliary power compound operate simultaneously and continuously at full load as this approach ensures that the worst-case or maximum short-term concentrations are quantified.
- 2.13. This is an overly conservative approach to the assessment as in practice, the auxiliary power compound will typically operate up to 180 hours per year and are extremely unlikely to operate simultaneously.
- 2.14. Furthermore, it is unlikely that the operation of the auxiliary power compound would coincide with all of the worst meteorological conditions (in terms of predicted PCs at assessed human receptor locations) each year. Therefore, the results presented are likely to be considerably higher than would reasonably be expected. Plate 1 and Plate 2 present isopleths for predicted annual mean and 1-hour mean (99.79<sup>th</sup> percentile) NO<sub>2</sub> concentrations. The figures are based on the year of meteorological data which resulted in the highest PC at a sensitive off-site human receptor location.

**Plate 1. Predicted annual mean NO<sub>2</sub> concentrations, 2020 meteorological data**



**Plate 2. Predicted 1-hour mean (99.79<sup>th</sup> percentile) NO<sub>2</sub> concentrations, 2023 meteorological data**



## Ecological receptors

### ***Assessment against Critical levels***

- 2.15. The environmental effects of releases from the site at the assessed protected conservation areas has been determined by comparing predicted concentrations of released substances with the EQSs for the protection of vegetation (critical levels) (see Table 6.1 in Chapter 6: Air Quality). The results of the detailed modelling at the assessed protected conservation areas are shown in Table 21. The results presented are the maximum predicted concentrations at the modelled locations for the five years of meteorological data used in the study area.

Table 21. Results of detailed assessment at assessed protected conservation sites for annual mean and maximum 24-hour mean NO<sub>x</sub> concentrations

Rec ref	Protected conservation area	EQS (µg/m <sup>3</sup> )	Background concentration (µg/m <sup>3</sup> )	PC (µg/m <sup>3</sup> )	PEC (µg/m <sup>3</sup> )	PC/EQS (%)	PEC/EQS (%)
<b>Annual mean NO<sub>x</sub> concentrations</b>							
H1	St David's Peninsula Coast SSSI	30	4.7	0.03	4.7	0.1%	15.8%
H2	Ramsey and St David's Peninsula Coast SPA & St David's / Ty Ddewi SAC		4.7	0.03	4.7	0.1%	15.8%
H3	Pembrokeshire Marine / Sir Benfro Forol SAC		4.6	0.03	4.7	0.1%	15.8%
H4	West Wales Marine / Gorllewin Cymru Forol SAC		4.5	0.03	4.7	0.1%	15.6%
<b>Maximum 24-hour mean NO<sub>x</sub> concentrations</b>							
H1	St David's Peninsula Coast SSSI	75	9.4	22.9	32.4	30.6%	43.2%
H2	Ramsey and St David's Peninsula Coast SPA & St David's / Ty Ddewi SAC		9.4	20.2	29.6	26.9%	39.5%
H3	Pembrokeshire Marine / Sir Benfro Forol SAC		9.4	19.3	28.8	25.8%	38.3%
H4	West Wales Marine / Gorllewin Cymru Forol SAC		9.3	18.6	27.9	24.9%	37.3%

- 2.16. The results in Table 21 indicate that at the assessed European designated sites and SSSI, the annual mean NO<sub>x</sub> PCs are less than 1% of the relevant critical level and the effect is considered **'insignificant'** as per NRW guidance<sup>19</sup>.
- 2.17. For the maximum 24-hour mean critical level for NO<sub>x</sub>, the PC is either less than 10% of the relevant EQS or where the PC is above 10% of the relevant EQS, the corresponding PEC is less than 70% of the relevant EQS and the impacts are considered **'not significant'**.
- 2.18. As discussed previously, this assessment assumes the assessed combustion plant operate simultaneously and continuously as a worst-case approach. In practice, the auxiliary power compound is unlikely to operate simultaneously or for a continuous period up to 24 hours. Therefore, the results presented are likely to be considerably higher than would reasonably be expected.

#### **Assessment against critical loads**

- 2.19. The rate of deposition of acidic compounds and nitrogen containing species have been estimated at the assessed protected conservation areas. This allows the potential for adverse effects to be evaluated by comparison with critical loads for acid and nutrient nitrogen deposition. The assessment took account of emissions of NO<sub>x</sub> only.
- 2.20. Critical load functions for acid deposition are specified on the basis of both nitrogen-derived acid and sulphur-derived acid. This information, including existing deposition levels at habitat sites, is available from APIS (Centre for Ecology and Hydrology, 2025). The results presented in Table 22 and Table 23 are the maximum predicted concentrations at the modelled locations for the five years of meteorological data used in the study area at the assessed ecological receptors.



Table 22. Modelled acid deposition at assessed protected conservation areas

Ref	Habitat	Vegetation type (for deposition velocity)	Critical load (CL) (kEqH+/ha/year)			Existing deposition (N) (S)	PC	PEC	PC/CL (%)	PEC/CL (%)
			CLMaxS	CLMinN	CLMaxN					
H1	St David's Peninsula Coast SSSI	Short	0.390	0.178	0.711	0.88	0.0002	0.88	0.03%	124%
		Tall	0.834	0.142	1.119	1.57	0.0005	1.57	0.04%	140%
H2	Ramsey and St David's Peninsula Coast SPA & St David's / Ty Ddewi SAC	Short	4.000	0.856	4.856	0.88	0.0002	0.88	0.005%	18%
H3	Pembrokshire Marine / Sir Benfro Forol SAC	Short	No critical load data available				0.0002	-		
H4	West Wales Marine / Gorllewin Cymru Forol SAC	Short	No critical load data available				0.0002	-		

Table 23. Modelled nutrient nitrogen deposition at assessed protected conservation areas

Rec ref	Protected conservation area	Vegetation type (for deposition velocity)	Minimal Critical Load (CL)	Existing nutrient deposition (kgN/ha-yr)	PC (kgN/ha-yr)	PEC (kgN/ha-yr)	PC/EQS (%)	PEC/EQS (%)
H1	St David's Peninsula Coast SSSI	Short	5	11.30	0.003	11.30	0.1%	226%
		Tall	10	20.20	0.007	20.21	0.1%	202%
H2	Ramsey and St David's Peninsula Coast SPA & St David's / Ty Ddewi SAC	Short	5	11.30	0.003	11.30	0.1%	226%
H3	Pembrokshire Marine / Sir Benfro Forol SAC	Short	5	11.10	0.003	11.10	0.1%	222%
H4	West Wales Marine / Gorllewin Cymru Forol SAC	Short	Species' broad habitat not sensitive to eutrophication		0.003	-		

- 2.21. The results in Table 22 and Table 23 indicate that at the assessed European designated sites / SSSI, the PCs are less than 1% of the relevant critical load value for acid and nutrient nitrogen deposition, and the impact can be described as '**insignificant**' as per NRW guidance<sup>19</sup>.

It should be noted acid and nitrogen deposition rates currently exceed their relevant critical loads at the majority of assessed protected conservation areas. However, this is a relatively common situation at protected conservation areas across the UK due to the high baseline deposition rates.

### Significance of air quality effects

- 2.22. Based on the findings of the assessment of pollutant emission during the operation phase, it is concluded that the proposed auxiliary power compound are acceptable from an air quality perspective and would be in accordance with both local and national policy as described in Section 1.



## ES Appendix 6.4: Air Quality Mitigation

## ES Appendix 6.4: Air Quality Mitigation

### 1. Construction Dust Risk Assessment Mitigation

- 1.1. Good practice mitigation measures would be needed to reduce the potential for dust emissions to lead to significant effects in the vicinity of the proposed development. The suggested good practice mitigation measures, which should be adopted for the proposed development are set out below in Table 24 to Table 28.
- 1.2. The mitigation measures have been derived from those specified in the IAQM construction dust guidance and where possible at this stage, adapted to the activities associated with construction of the proposed development. Measures such as those specified in the guidance would normally be sufficient to reduce construction dust nuisance and risks to human health to a 'not significant' effect. These measures are listed in Table 24 to Table 28 with a recommendation as to whether or not they should be applied based on the risk levels identified in the dust assessment. Some specific comments or observations have been added or amendments to the text undertaken, where appropriate. Some of the mitigation measures listed within the IAQM guidance for trackout (mitigation numbers 44, 46, 47 and 48) were considered to represent general on-site activities and operation on haul roads and were moved to the 'Operations' section (see Table 24) of the general mitigation measures required for all sites.
- 1.3. The general mitigation measures were specified based on the highest risk category identified (i.e. the medium risk identified for earthworks and construction activities) as recommended by IAQM construction dust guidance. It may not be necessary to adopt all the good practice mitigation measures set out below across the proposed development.
- 1.4. As specified above, the measures to control dust emissions taken forward from this assessment, derived from the highly recommended or desirable measures and the monitoring of the effectiveness of the mitigation, would be included in the air quality management strategies set out in the CEMP.
- 1.5. When applying the mitigation measures, IAQM construction dust guidance states the following:
- 1.6. *'The most important aspects of the Dust Management Plan are assigning responsibility for dust management to an individual member of staff of the principal contractor, training staff to understand the importance of the issue, and communicating with the local community. Good dust management practices implemented at high risk sites have resulted in no or minimal complaints, which illustrates the value of the recommended approach.'*
- 1.7. The mitigation measures set out in Table 24 to Table 28 do not specifically include assigning responsibility for dust management to a staff member or training staff on the importance of dust management and awareness of dust issues. These would be included within the proposed mitigation measures.

Table 24. General Mitigation Measures

Mitigation Measure	Highly recommended / Desirable / Not Required
1. Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. (see General Measure G5 in Appendix 3.1)	Not required
2. Display the name and contact details of the person(s) accountable for air quality pollutant emissions and dust issues on the site boundary. This may be the environment manager/engineer or the site manager	Highly recommended
3. Display the head or regional office contact information.	Highly recommended
4. Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. The DMP may include monitoring of dust deposition, dust flux, real time PM <sub>10</sub> continuous monitoring and/or visual inspections. (see General Measure G7 in Appendix 3.1)	Highly recommended
<b>Site Management</b>	
5. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner and record the measures taken.	Highly recommended
6. Make the complaints log available to the local authority when asked.	Highly recommended
7. Record any exceptional incidents that cause dust and/or air emissions, either on-site or off-site, and the action taken to resolve the situation in the logbook.	Highly recommended
8. Hold regular liaison meetings with other high-risk construction sites within 250 m of the Proposed Scheme, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.	Not required
<b>Monitoring</b>	
9. Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust and record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of the site boundary, with cleaning to be provided if necessary (see Air Quality Measure AQ1 in Appendix 3.1).	Desirable
10. Carry out regular site inspections to monitor compliance with the CEMP or equivalent document, record inspection results and make an inspection log available to the local authority when asked (see Air Quality Measure AQ2 in Appendix 3.1).	Highly recommended
11. Increase the frequency of site inspections by the person accountable for air quality and dust issues on-site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions (see Air Quality Measure AQ3 in Appendix 3.1).	Highly recommended
12. Agree dust deposition, dust plant or real-time PM <sub>10</sub> continuous monitoring locations with the local authority. Further guidance is provided by IAQM <sup>32</sup> on monitoring during earthworks and construction (see Air Quality Measure AQ4 in Appendix 3.1).	Highly recommended
<b>Preparing and maintaining the site</b>	
13. Plan site layout so that machinery and dust-causing activities are located away from receptors, as far as is possible.	Highly recommended
14. Erect solid screens or barriers around dusty activities, or the site boundary, which are at least as high as any stockpiles on-site.	Highly recommended

32 Institute of Air Quality Management (IAQM) (2018). Air Quality Monitoring in the Vicinity of Demolition and Construction Sites 2018.

Mitigation Measure	Highly recommended / Desirable / Not Required
15. Fully enclose site or specific operations where there is a high potential for dust production and the site boundary is active for an extended period.	Highly recommended
16. No discharge of site runoff to ditches, watercourses, drains, sewers or soakaways without consultation of the appropriate authorities.	Highly recommended
17. Keep the site fencing, barriers and scaffolding clean using wet methods.	Highly recommended
18. Remove materials that have a potential to produce dust from the site as soon as possible, unless being re-used on-site. If they are being re-used on-site, cover as described below.	Highly recommended
19. Cover, seed or fence stockpiles to prevent wind-whipping as soon as is reasonably practicable following completion of earthworks.	Highly recommended
<b>Operating vehicle/machinery and sustainable travel</b>	
20. Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London non-road mobile machinery (NRMM) standards, where applicable.	Not applicable
21. Ensure all vehicles switch off engines when stationary- no idling vehicles.	Highly recommended
22. Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	Highly recommended
23. Impose and signpost a maximum speed limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	Desirable
24. Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	Not required
25. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car sharing) and stipulates the avoidance of HDV movements through Air Quality Management Areas where practicable.	Desirable
<b>Operations</b>	
26. Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	Highly recommended
27. Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	Highly recommended
29. Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	Highly recommended
30. Ensure equipment is readily available on-site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	Highly recommended
44. Avoid dry sweeping of large areas.	Highly recommended
46. Inspect on-site haul routes for integrity and instigate any necessary repairs to the surface as soon as reasonably practicable.	Highly recommended
47. Record all inspections of haul routes and any subsequent action in a site logbook.	Highly recommended
48. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers, and regularly cleaned.	Highly recommended
<b>Waste Management</b>	

Mitigation Measure	Highly recommended / Desirable / Not Required
31. Avoid bonfires and burning of waste materials	Highly recommended

Table 25. Mitigation Measures Specific to Demolition

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

Table 26. Mitigation Measures Specific to Earthworks

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

Table 27. Mitigation Measures Specific to Construction

Mitigation Measure	Highly recommended / Desirable / Not Required
39. Avoid scabbling (roughening of concrete surfaces) if possible.	Desirable
40. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	Highly recommended
41. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	Desirable
42. For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.	Desirable

Table 28. Mitigation Measures Specific to Trackout<sup>1</sup>

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

Note 1: This assessment assumes the temporary construction access will be located on the C3010, approximately 0.9km north of the junction of the C3010 with the A487 at Penycwm and no sensitive human or ecological receptors will be within 20m of the construction route up to 250m from the potential site exit.