16. **AIR QUALITY**

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16. AIR QUALITY

16.1 Summary

16.1.1 This Chapter considers the potential dust and air quality effects associated with the construction and decommissioning phases of the Ardtaraig Wind Farm hereon after referred to as the ‘Proposed Development’. Infrastructure to be constructed includes the turbine and turbine pads, access tracks, substation and associated infrastructure and borrow pits.

16.1.2 The air quality assessment considers air quality and dust guidance from PAN 50 and the Institute of Air Quality Management ‘Guidance on the Assessment of Dust from Demolition and Construction’ 2014. The guidance documents specify borrow pits should be assessed as a quarrying activity up to 500 m and the IAQM Construction Guidance states dust from construction should be assessed up to 350 m from the dust sources. Particulate matter effects are assessed up to 1 km in accordance with national guidance policies.

16.1.3 The baseline assessment has concluded the background PM10 and PM2.5 concentrations are very low due to the rural character of the Proposed Development site. The assessment has identified only two existing sensitive receptor localities (totalling six residential dwellings) in the vicinity of the Proposed Development which may be affected by dust.

16.1.4 A construction phase assessment has been undertaken which determines the risk of dust soiling and human health effects is low for trackout and negligible for earthworks and construction.

16.1.5 Dust mitigation is outlined in the accompanying outline Construction Environmental Management Plan (OCEMP). The implementation of the dust management and mitigation measures will ensure dust is controlled at the source and is minimised. By association, particulate matter generation during construction will also be reduced and mitigated.

16.2 Introduction

16.2.1 This chapter addresses the issues associated with the potential air and dust impacts during the construction, operation and decommissioning stages of the proposed development.

16.2.2 The Proposed Development comprises seven wind turbines with associated hardstanding area, new access tracks, underground cabling, seven watercourse crossings, four borrow pit search areas, control building, substation and battery storage facility compound and a temporary construction compound.
16.2.3 The Proposed Development is known as Ardtaraig Wind Farm and is located at the hill of Cruach nan Cuilean, which lies within the administrative boundary of Argyll and Bute Council.

16.2.4 The primary construction areas and potential borrow pit activities are located approximately 2.5 km to the east and south east of the nearest existing sensitive receptors, which are located along the A886. Following a 25 year operational life span, the turbines would be decommissioned in a coordinated deconstruction process. The majority of the decommission phase is more typical of construction type activities rather than destructive demolition processes. **Figure 16.1** shows the existing sensitive receptors assessed in this Chapter and the site layout for all elements of construction.

16.2.5 During the operational lifespan, the generation of electricity from the turbines will produce no gaseous emissions and will not contribute directly to local air pollution. Therefore, the air quality impacts associated with the proposed development are confined to the initial construction and decommissioning phases only.

### 16.3 Consultations

16.3.1 A Scoping Report was submitted to Argyll and Bute Council (A&B) by the Applicant in November 2016 (refer to **Chapter 1: Introduction** and **Appendix 2.A**).

16.3.2 The air quality scoping opinion outlined the proposed methodology to be considered in this air quality Chapter:

- The assessment would consider the impact at human (residential and amenity) and ecological sensitive receptors for the construction and decommissioning phases. The results of the construction phase would be used to determine the level of impact during decommissioning as decommissioning is more attributable to construction type activities than demolition.

- There are no specific guidance documents released by either Argyll and Bute or the Scottish Government in relation to dust from construction and/or turbines. The air quality and dust assessment would consider the Institute of Air Quality Management ‘Guidance on the Assessment of Dust from Demolition and Construction’ 2014.

- In accordance with the IAQM Construction Guidance\(^1\), impacts to human receptors would be predicted up to 350m, ecological at 50m and trackout up to 50m either side of a construction route, up to 500m from the site exit. Impacts would be predicted for earthworks, construction and trackout (and demolition where applicable).

- Borrow pits would be assessed in accordance with Planning Advice Note (PAN) 50: Controlling the Environmental Effects of Surface Mineral Workings.

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• Background pollutant concentrations would be obtained from the 2013-based Defra default concentration maps for the appropriate grid squares (updated to reflect recent guidance changes i.e. 2015-based background maps).

• The wind farm is located in a relatively isolated location and there are no human or ecological sensitive receptors within 2.5km of the turbines. However, trackout impacts will require assessment.

• Measures to mitigate and manage dust would be outlined in an overarching Construction Management Plan.

16.3.3 Correspondence relating directly to air quality were received on 5th January 2017. Malcolm Chattwood (Environmental Protection Officer) of Public Protection at Argyll and Bute stated:

"The applicants should consider the potential for dust emissions from the site and access roads/tracks during the construction phase on any nearby sensitive properties. Where such an impact is considered significant, the applicants should prepare a draft ‘Construction Management Plan’ outlining their proposed mitigation measures (to be agreed with Argyll and Bute Council prior to commencement of the development)."

• An outline Construction Environmental Management Plan (OCEMP) is submitted as part of the ES (refer to Appendix 3.B).

16.4 Legislative framework

16.4.1 The Scotland Third National Policy Framework, ‘Scottish Planning Policy’2, was legislated in June 2014. This document sets forth planning strategies and plans stating the requirements and expectations of existing and new developments in Scotland over the next five years.


16.5 Air Quality Standards and Objectives

16.5.1 The Air Quality Strategy (AQS), 2000 sets objectives for eight pollutants, which may potentially occur in the UK at levels that give cause for concern. These pollutants are: nitrogen dioxide, sulphur dioxide, carbon monoxide, lead, fine particulates (PM10 and PM2.5), benzene, 1, 3-butadiene and

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2 Scotland’s Third National Planning Framework 3 (NPF3)
3 The Scottish Office Development Department Planning Advice Note PAN 50 Annex B Controlling the Environmental Effects of Surface Mineral Workings, The Control of Dust at Surface Mineral Workings 1998
ozone. Of the eight pollutants listed, only PM10 is relevant to this assessment as it is a constituent of dust.

16.5.2 Heavy goods vehicles (HGV) movements throughout the construction phase are not expected to exceed 100 HGV movements over a 24 hour AADT period. Due to the area of development, complexities of accessing the site and overall timescale of the development, it is considered the majority of plant and vehicles will be confined to the site. Construction materials will be sourced from within the site at the four borrow pits. In accordance with the criteria for detailed assessment defined in Environmental Protection UK (EPUK) 2017 Guidance. Current levels of nitrogen dioxide and particulate matter in the vicinity of the Site are well below the Air Quality Objectives.

16.5.3 The Air Quality Strategy (AQS), 2000 sets objectives for eight pollutants, which may potentially occur in the UK at levels that give cause for concern. These pollutants are: nitrogen dioxide, sulphur dioxide, carbon monoxide, lead, fine particulates (PM10 and PM2.5), benzene, 1, 3-butadiene and ozone. Of the pollutants listed, only PM10 and PM2.5 are relevant to this assessment.

16.5.4 The AQS objective for PM10 was given statutory status in the Air Quality (Scotland) Regulations, 2000,5 Air Quality (Scotland) Amendment Regulations 2002 and the most recent version, Air Quality Standards (Scotland) Regulations 2010.

16.5.5 EU Directive 2008/50/EC8 was authorised for use in June 2008 and was transposed into UK legislation on 11th June 2010. This EU Directive consolidates existing air quality legislation and provides a new regulatory framework for PM2.5.

16.5.6 The current Air Quality Standards and Objectives applicable for this assessment are detailed in Table 16.1.
Table 16.1 Air Quality Standards (Scotland) Regulations 2010. Summary of current air quality standards and objectives

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging period</th>
<th>Limit value</th>
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<tbody>
<tr>
<td>PM$_{10}$</td>
<td>24 hour mean</td>
<td>50µg/m$^3$ not to be exceeded more than 35 times in a calendar year</td>
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<td></td>
<td>Calendar year</td>
<td>18µg/m$^3$</td>
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<tr>
<td>PM$_{2.5}$</td>
<td>Calendar year</td>
<td>10µg/m$^3$</td>
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</table>

16.6 Local authority obligations

16.6.1 The Proposed Development is located in the administrative area of Argyll and Bute (A&B). The 2017 Annual Progress Report (APR) provides further details of local air quality. A&B is rural with over 75% classified as remote and a population which is widely distributed. The Council has not identified any areas where air quality objectives may be close to exceeding objectives or require mitigating actions to improve air quality.

16.6.2 Figures 8 and 9 of the APR identify modelled background concentrations for NO$_2$ and PM10 are very low at 2 to 2.5 µg/m$^3$ and 7 to 8 µg/m$^3$ respectively at the site.

16.6.3 In conclusion, air quality is not considered to be a material concern at the Proposed Development site or at nearby sensitive receptors.

16.7 National Guidance and Dust Effects

16.7.1 ‘Dust’ is a generic term and has no universally recognised definition. However, the Department of the Environment Minerals Division, December 1995 described ‘dust’ as comprising organic or inorganic particles in the size range of 1-75µm. Dust particles with an aerodynamic diameter between 1 and 10µm are classed as particulate matter and those between 10 and 75µm are simply termed dust. Air quality legislation recognises PM$_{10}$ (10µm) and PM$_{2.5}$ (2.5µm) are important particle sizes in relation to public health. Particles less than 1µm behave more like gases than solids and are generally referred to as ‘fume’, whereas particles larger than 75µm are termed ‘grit’.

16.7.2 Research commissioned by the Department of the Environment and reported in the Digest of Environmental Pollution Statistics No. 2 1979, has shown that dust particles, greater than 30µm (large particles), make up the greatest proportion (c.95%) of mineral dusts such as those which will be...
expected to be emitted during quarry operations. It is generally accepted that the greatest dust impacts and deposition will occur within 100m of a source and this includes both large (>30 μm) and small dust particles.

16.7.3 PAN 50 classifies borrow pits as a quarrying activity. The document states dust may occur up to 500m from a dust source whereas the IAQM Mineral Guidance\textsuperscript{10} recognises that dust will travel up to 250m for soft rock quarries and 400m for hard rock quarries.

16.7.4 The potential impact on the local community of large and intermediate dust particles dispersing from the quarry is principally its potential to cause annoyance or nuisance. The IAQM refers to these effects as ‘disamenity dust’.

16.7.5 The IAQM Minerals Guidance comprises a literature review of most if not all of the document used to prepare PAN 50. The IAQM Document provides an update of quarrying guidance and provides stricter criteria assessment than PAN 50. For example PAN 50 states residential receptors are medium sensitivity whereas the IAQM Minerals Guidance states they are highly sensitive.

16.7.6 Dust complaints are usually associated with periods of peak deposition, occurring during particular weather conditions. When the rate of disamenity dust exceeds the ‘norm’ and accumulates on surfaces such as vehicles or window ledges, a nuisance may be perceived by the sensitive receptor. There is a ‘normal’ level of dust deposition in every community and only when dust deposition rates increase or fluctuate from the ‘norm’ can complaints become more likely. However, nuisance is subjective and is difficult to determine accurately as, in part, it depends upon the perceptions of individual residents or households and complaints may not always be received. The effect of dust on a community can be determined by five main factors:

- the location of the potential dust source relative to the community;
- the duration of the site activities that contribute to dust;
- the short-term dustiness during periods of dry weather (climatic factors);
- the frequency or regularity with which these occur; and
- the effectiveness of dust control measures adopted by the site operator.

16.7.7 There are no statutory thresholds for dust deposition or nuisance from quarry operations. PAN 50 states a value of 200 to 350 mg/m\textsuperscript{2}/day as an indicator for nuisance dust. The Environment Agency considers a custom-and-practice dust deposition guideline value of 200 mg/m\textsuperscript{2}/day as an indicator for when complaints may arise\textsuperscript{11}. A threshold of 200 mg/m\textsuperscript{2}/day is used throughout the UK quarrying industry.


16.8 Particulate Matter (PM$_{10}$ & PM$_{2.5}$)

16.8.1 Research has been carried out into acute health effects associated with the inhalation of particulate matter. Inhaled mineral dust with an aerodynamic diameter in excess of 10µm stops in the upper respiratory tract where the particles get trapped in the mucous lining of the nasopharyngeal tract. Dust in the range 10 – 75µm is therefore normally considered not to be a notable health concern, unless the particles are of toxic mineralogy.

16.8.2 The IAQM Minerals Guidance recognises that quarries typically comprise suspended dusts in the coarse sub-fraction (PM2.5-10) rather than in the fine fraction (<PM2.5). Particulate matter is rarely exceeded close to mineral sites as they are commonly in rural settings where background concentrations and vehicle emissions are low.

16.8.3 Research suggests that of the small proportion of mineral dust emissions from construction sites (which are comparable to those from quarry sites in their size and composition) which are in the range 1-10µm, only 10% to 15% (by weight) are in the PM2.5 fraction.

16.8.4 Information on the PM10 process contribution from quarries and construction sites is limited. Appendix 5 of the IAQM Minerals Guidance provides a literature review of possible process contributions from quarries:

- local air quality management technical guidance LAQM.TG(03) – mathematical calculation and graphical plot considers decreasing PM$_{10}$ process contribution with distance, a maximum 1 µg/m$^3$ is predicted at locations closest to the quarry source, for the short term PM$_{10}$ objective. The annual mean is classed as variable, up to 5 µg/m$^3$;

- the Newcastle Study considered PM$_{10}$ contributions near open cast coal mining sites. A maximum PM$_{10}$ process contribution of 2 µg/m$^3$ was determined from the study; and

- Committee on Medical Effects of Air Pollutants (2002) – The research concluded that a +14% factor should be applied to the worst case annual background concentration.

16.8.5 There is little research on the PM$_{2.5}$ contribution from construction and quarrying. LAQM.TG(16) provides a methodology for determining PM$_{2.5}$ from PM$_{10}$ which states that both are linked by a factor of 0.7. The full methodology is outlined in Annex B of LAQM.TG(16).

16.8.6 In most cases the fine particulate matter risk can be discounted. The following text is taken from the IAQM Minerals Guidance but it applies to England only. It has been provided for completeness:

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15 Department for Environment, Food and Rural Affairs 2016. Local Air Quality Management Technical Guidance
"If the long term background PM$_{10}$ concentration is less than 17 μg/m$^3$ there is little risk that the Process Contribution (PC) would lead to an exceedance of the annual-mean objective and such a finding can be put forward qualitatively, without the need for further consideration, in most cases."

16.8.7 The risk of exceeding the short term PM$_{10}$ objective is unlikely to occur in Scotland. LAQM.TG(16) states the risk of exceeding the 50 μg/m$^3$ may occur when background concentrations are above 32 μg/m$^3$. Scottish air quality objectives for fine particulate matter are strict therefore, concentrations would rarely be near or approach 32 μg/m$^3$.

16.9 **Methodology**

16.9.1 The scoping report submitted to A&BC outlined the methodology to be taken for the air quality assessment, including details of which guidance documents would be considered in the report. For the avoidance of doubt, the following methodology will be undertaken:

- Construction dust impacts on human and ecological sensitive receptors would be assessed in accordance with the IAQM Construction Guidance.
- Borrow pit activities will be assessed using the criteria and guidance contained within both PAN 50 and the IAQM Minerals Guidance.
- The decommissioning phase of the Proposed Development will involve activities similar to construction (earthworks, construction and trackout) rather than destructive demolition activities. The decommission phase is therefore considered to be a construction activity and not demolition.
- Dust mitigation is outlined in the CEMP.

**Construction phase assessment – dust emissions**

16.9.2 The PAN 50 Guidance document outlines the necessary assessment requirements for quarries. PAN 50 states PM$_{10}$ impacts may occur up to 1 km from the dust source. This PM$_{10}$ criteria has been considered for the construction phase assessment.

16.9.3 However, in light of specific dust construction guidance, the IAQM Construction Guidance will be used to assess the likely impact of earthworks, construction and trackout activities associated with the construction activities at the site. A distance of up to 350m from the dust source and up to 50m of a 500m trackout route is considered for the IAQM Construction Guidance. PAN 50 states borrow pits should be assessed as a quarrying activity and up to 500m from the dust source.

16.9.4 PAN 50 states that the assessment should: establish baseline conditions; identify dust generating site activities; identify site parameters which could increase dust impacts and recommend dust mitigation measures. This approach is largely similar to the approach adopted within the IAQM Construction Guidance.
16.9.5 Step 1 of the assessment is to screen the requirement for a more detailed assessment of dust and particulate matter. The IAQM Guidance states a detailed dust assessment is required if there are sensitive receptors (human) within 350m of a dust source, 50m of an ecological designation or within 50m of a 500m length of the route to be used by construction traffic.

16.9.6 There are sensitive receptors within this distance therefore, it is necessary to proceed to Step 2.

16.9.7 Step 2 of the assessment determines the potential risk of dust arising in sufficient quantities to cause annoyance, or health impacts and/or ecological impacts. The risk is related to:

- the activities being undertaken (demolition, number of vehicles and plant etc.);
- the duration of these activities;
- the size of the site;
- the meteorological conditions (wind speed, direction and rainfall);
- the proximity of receptors to the activity;
- the adequacy of the mitigation measures applied to reduce or eliminate dust; and
- the sensitivity of receptors to dust.

16.9.8 The risk of dust effects is determined using four risk categories: negligible, low, medium and high risk. A site is allocated to a risk category based upon two factors:

- Step 2A – the scale and nature of the works which determines the potential dust emission magnitude as small, medium or large.
- Step 2B – the sensitivity of the area to dust impacts which is defined as low, medium or high sensitivity.

16.9.9 These two factors are then assessed (Step 2C) to determine the risk of dust impacts with no mitigation applied.

16.9.10 The risk of dust effects is determined for three types of construction phase activities, with each activity being considered separately. If a construction phase activity is not taking place on the site, then it does not need to be assessed. The three types of activities to be considered are:

- earthworks;
- construction; and
- trackout.

16.9.11 As discussed, the decommissioning phase is considered to be more representative of earthwork and construction type activates rather than
destructive demolition. Therefore, demolition activities are not considered further.

Step 3

16.9.12 Step 3 of the assessment determines the site-specific mitigation required for each of the activities, based on the risk determined in Step 2. Mitigation measures for dust are detailed in guidance published by the IAQM Construction Guidance\(^1\) and the PAN 50\(^3\). Site specific mitigation measures have been outlined in subsection “Mitigation Measures” of this Chapter.

Step 4

16.9.13 Step 4 assesses the residual effect to determine whether dust could still be significant with mitigation measures in place.

Sensitive Receptors

16.9.14 The majority of the Proposed Development will be constructed further than 350m from the nearest sensitive receptors. The primary working areas (i.e. turbine construction, access routes, borrow pits, substation) will occur on the top of Cruach nan Cuilean. These construction areas are located approximately 2.5km from the existing sensitive receptors, located along the A886 to the west of the site. The construction areas are also up to 250m higher than the sensitive receptor locations.

16.9.15 The only dust source capable of affecting surrounding sensitive receptors is considered to be trackout from the site access, onto the A886.

16.9.16 Two existing sensitive receptors have been identified along the A886. These are located approximately 350m to the north and south of the existing access route, and are outlined in Table 16.2 below and shown on Figure 16.1. ‘Existing sensitive receptor (ESR) 1’ comprises a single dwelling and ESR 2 includes five dwellings. All other surrounding dwellings are located more than 350m from a construction area and/or 500m from the site exit.

<table>
<thead>
<tr>
<th>Table 16.2 Existing Sensitive Receptor Locations</th>
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<tr>
<td>Existing Sensitive Receptor</td>
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<tr>
<td>ESR 1</td>
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<td>ESR 2</td>
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16.9.17 There are no sensitive receptors located within 500m of a proposed borrow pit search area. The requirement for a quarrying dust assessment is therefore not applicable. The remainder of this report refers to the construction phase and decommissioning phases only.

16.9.18 For particulate matter dispersal within 1km of a dust source, there are two further localities which contain highly sensitive receptors (dwellings). These are located at Conchra to the north of ESR 1 and a number of dwellings to
the south of ESR 2 along the A886. These two locations are located approximately 800 m from the site access route and are affected by trackout emissions only.

16.9.19 There is no ecological designation within 50 m of a dust source and/or within 500 m of a construction route. A requirement for assessment of ecology has been scoped out.

16.9.20 The Land Reform (Scotland) Act 2003 provides freedom of access for recreational use for much of the Scottish landscape. These situations cannot be accounted for in the assessment as there is no definitive location where a receptor could be located therefore, only core paths and/or dedicated routes have been assessed. The A&G website states the following for public rights of way:

"In Scotland there is no requirement for a local authority to maintain a "Definitive Map of Public Rights of Way" therefore records of Public Rights of Way are very poor. Local Authorities do have a legal duty to keep Public Rights of Way open and free from obstruction. However there is no duty to maintain Public Rights of Way although powers do exist to carry out work on them.

Generally a local authority will only become aware that a path may be a Public Right of Way when it is blocked or a developer proposes to close it. Therefore the minority of Public Rights of Way have been recorded anywhere."

16.9.21 Public rights of way have therefore not been assessed. The residential receptors represent a worst case assessment therefore the omission of public walking routes for assessment will not affect the overall conclusion of this Chapter.

Assessment of significance

Sensitivity of the area for human receptors

16.9.22 Based upon the category of receptor sensitivity, the sensitivity of the area to the health effects of PM$_{10}$ is determined using the criteria detailed in Table 16.3.

<table>
<thead>
<tr>
<th>Receptor sensitivity</th>
<th>Annual mean PM$_{10}$ concentration</th>
<th>Number of receptors</th>
<th>Distance from source (m)</th>
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<td>&lt;20m</td>
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<td>High</td>
<td>&gt;18µg/m$^3$</td>
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<td>16-18µg/m$^3$</td>
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<td>High</td>
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### Receptor sensitivity

<table>
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<tr>
<th>Receptor sensitivity</th>
<th>Annual mean PM$_{10}$ concentration</th>
<th>Number of receptors</th>
<th>Distance from source (m)</th>
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<tr>
<td>1-10</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>&gt;10</td>
<td></td>
<td></td>
<td></td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>&lt;14µg/m$^3$</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>1-10</td>
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<td></td>
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<tr>
<td>&gt;10</td>
<td></td>
<td></td>
<td></td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
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<tr>
<td>Low</td>
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<td></td>
</tr>
</tbody>
</table>

#### 16.10 Risk of dust impacts

16.10.1 No demolition activities are proposed.

16.10.2 The risk of dust being generated by earthworks and construction activities at the site has been determined using the criteria in Table 16.4
Table 16.4: Risk of dust impacts – earthworks and construction

<table>
<thead>
<tr>
<th>Sensitivity of area</th>
<th>Dust emission magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

16.10.3 The risk of dust being generated by trackout from the site is determined using the criteria in Table 16.5.

Table 16.5: Risk of dust impacts - trackout

<table>
<thead>
<tr>
<th>Sensitivity of area</th>
<th>Dust emission magnitude</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Large</td>
</tr>
<tr>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Low</td>
<td>Medium</td>
</tr>
</tbody>
</table>

16.11 Baseline

16.11.1 The Proposed Development site is rural and is not located close to any major pollutant sources. There is a limited number of existing dust and particulate matter sources in the vicinity of the site:

- Road traffic – exhaust particles and emissions from the road surfaces;
- Long range transport; and
- Domestic fuel burning.

16.11.2 The effect of transported dust is principally its potential to cause annoyance or nuisance. For instance, dust soiling onto houses or vehicles. The effectiveness of dust mitigation to reduce soiling also significantly limits the potential for particulate matter to be generated. Therefore, an effective dust mitigation strategy will limit the particulate matter generated.

16.11.3 A&B do not undertake any monitoring in the vicinity of the site. Baseline PM\(_{10}\) and PM\(_{2.5}\) concentrations have been obtained from Defra 2015-based default concentration maps\(^\text{16}\).

\(^\text{16}\) https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015
### Table 16.6: Background concentrations of particulate matter (μg/m³) as an annual mean for 2018

<table>
<thead>
<tr>
<th>Existing sensitive receptor</th>
<th>Grid square (x, y)</th>
<th>PM&lt;sub&gt;10&lt;/sub&gt;</th>
<th>PM&lt;sub&gt;2.5&lt;/sub&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESR 1</td>
<td>x:202346, y:688524</td>
<td>6.02</td>
<td>3.99</td>
</tr>
<tr>
<td>ESR 2</td>
<td>x:201866, y:687954</td>
<td>6.04</td>
<td>4.04</td>
</tr>
</tbody>
</table>

#### 16.12 Assessment of impacts

16.12.1 As discussed, only trackout is located within 350 m of an existing sensitive receptor. All other construction activities are located more than 350 m and all borrow pits are located more than 500 m from an existing sensitive receptor.

16.12.2 The assessment of impact therefore only considers trackout as all other aspects of construction and quarrying have been scoped out due to distance.

**Access route**

16.12.3 The existing route from the A886 forms part of the historic track routing for the adjacent existing wind farm development, known as Cruach Mhor Wind Farm. Consequently, the only track construction required is where the route diverges from the existing wind farm to the Proposed Development turbine locations. This is located approximately 2 km to the east of the A886.

16.12.4 The existing access route at the A886, and closest to the existing sensitive receptors, is a hard packed gravel route. Consequently, dust emissions arising from this surface would be minimal. The pickup and tracking of mud and dirt from the turbine construction areas is also expected to be minimal as the existing route between the A886 and the Cruach Mhor Wind Farm is approximately 5 km in length. Over this route length, any mud is expected to naturally drop off before reaching the exit point at the A886.

16.12.5 The existing route would be maintained during the construction process and the new access routes to be constructed at the turbine areas would be transitioned to a hard packed aggregate surface overtime, using aggregate obtained from the proposed borrow pit search areas.

**Construction Phase Assessment – Dust Emissions**

16.12.6 The main activities involved with the construction phase of works are earthworks, construction and trackout.

16.12.7 Earthworks which may be required prior to the construction phase of works. The following examples of earthworks would be used across all activities within the Proposed Development.

- Clearing the footprint of a borrow pit;
- Stripping and stockpiling of topsoil and subsoil;
• Ground excavation;
• Bringing in, tipping and spreading materials on site;
• Stockpiling materials;
• Levelling ground;
• Trenching;
• Road construction;
• Vehicle movements on site roads; and
• Windblown materials from the site.

16.12.8 Construction which would involve the construction of individual access roads, temporary construction compound, control building substation and battery storage facility compound, potential borrow pit infrastructure, crane hardstandings and the proposed turbines.

16.12.9 The decommissioning will comprise co-ordinated dismantling of the turbines and restoring the land back to its former use i.e. earthworks for the access routes and borrow pits and trackout for construction vehicles. The decommissioning phase is similar to the construction practices to occur therefore the risk and mitigation determined for the construction should be utilised for decommissioning. It is the responsibility of the Applicant and/or future owner to ensure dust mitigation is updated accordingly to future legislation, guidance and best practice.

16.12.10 Trackout which is the transport of dust and dirt to the public highway network via trailing or depositing mud and dirt from the construction zones. The trackout of mud is expected to be minimal. Dust arising from the hard-packed existing access route is deemed to be the only origin of dust through trackout.

Step 2A

16.12.11 Step 2A of the construction phase dust assessment has defined the potential dust emission magnitude from earthworks, construction activities and trackout in the absence of site specific mitigation.

16.12.12 Examples of the criteria for the dust emission classes are detailed in the IAQM guidance.

Step 2B

16.12.13 Step 2B of the construction phase dust assessment has defined the sensitivity of the area, taking into account the significance criteria detailed in the IAQM Guidance. The sensitivity of the area for each activity is assessed for potential dust soiling and human health effects.

16.12.14 There are no existing sensitive receptors affected by earthwork or construction activities from the Proposed Development.
16.12.15 The routing of vehicles from the site exit is not known. Therefore, for the purposes of this assessment we have assumed both the northern (ESR 1) and southern (ESR 2) routes would be affected by trackout from the site.

16.12.16 For trackout, there are 1 to 10 existing residential receptors located within 20 m of a construction route, up to 500 m from the site exit. The sensitivity of the area for dust soiling is deemed to be medium. The sensitivity of the area for particulate matter effects is deemed to be low.

**Step 2C**

16.12.17 Step 2C of the construction phase dust assessment has defined the risk of impacts from each activity. The dust emission magnitude is combined with the sensitivity of the surrounding area.

16.12.18 The risk of dust impacts from trackout, with no mitigation in place, has been assessed in accordance with the criteria detailed in Table 16.3 to 16.5 and is outlined in Table 16.7.

**Summary**

**Table 16.7 Construction phase dust assessment (Step 2) – Human Receptors**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Demolition</th>
<th>Earthworks</th>
<th>Construction</th>
<th>Trackout</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 2A</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust Emission magnitude</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Medium&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Step 2B</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensitivity of closest receptors</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>High</td>
</tr>
<tr>
<td>Sensitivity of area for dust soiling effects</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Medium</td>
</tr>
<tr>
<td>Sensitivity of area to human health effects</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Low&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Step 2C</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dust soiling risk</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Low</td>
</tr>
<tr>
<td>Human health risk</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Low</td>
</tr>
</tbody>
</table>

Notes:

a. Estimation of the dust emission class based on the size of the Proposed Development site (large), estimated HGV movements per day and access route
Activity | Demolition | Earthworks | Construction | Trackout
---|---|---|---|---
surface material.

b. Background annual mean PM\textsubscript{10} concentration are less than 14 µg/m\textsuperscript{3} (taken from the LAQM Defra default concentration maps, for the appropriate grid squares, for 2018).

16.12.19 The risk of adverse particulate matters effects on human health is deemed to be low for trackout on all sensitive receptors located within 1 km of the access routes.

16.12.20 The areas of earthwork and construction (including movement of vehicles on the access tracks to be constructed) are located more than 1 km from the nearest existing sensitive receptors, and the risk of effect is therefore deemed to be negligible.

16.12.21 Although it is determined that there will be no particulate matter effects due to distance from source, it is worth noting that even if the maximum contribution was applied (from paragraph 16.3.3 of this Chapter), the overall concentrations would still be well below the air quality objectives for PM\textsubscript{10}.

### 16.13 Mitigation measures

**Step 3**

16.13.1 Step 2C of the construction phase assessment has identified that:

- The risk of dust soiling effects and human health effects is deemed to be low for trackout.

16.13.2 These risks assume that no mitigation measures are applied, except those required by legislation. Site specific mitigation measures do not need to be recommended if the risk category is negligible.

16.13.3 As the risk category for these activities are not 'negligible', site specific mitigation measures will need to be implemented to ensure that dust effects will not be significant. A Construction Environment Management Plan has been prepared for this Environmental Statement submission. Within this document, dust-specific mitigation is provided.

16.13.4 Although the earthworks and construction effects have not been assessed in this Chapter it is noted that their omission does not negate a requirement for dust mitigation for those activities.

16.13.5 General best practice mitigation will be undertaken and in the majority of cases these are applied as standard by the construction contractors. These may include reduce drop heights, speed limits, expose areas of working gradually and cover as soon as possible and grade access routes to limit dust. Specific activities such as wetting construction areas and revegetating...
surfaces as soon as possible are deemed to be not necessary due to the rural setting of the Proposed Development. Additionally, no dust monitoring is deemed to be required.

16.13.6 The existing access route is approximately 5 km in length and includes a hard-packed aggregate surface which is expected to significantly reduce the trackout associated with the Proposed Development. Infrastructure such as a wheel wash or rumble grid is deemed to be not necessary.

16.13.7 The full dust mitigation scheme for the Proposed Development is outlined in the CEMP (refer to Appendix 3.B).

16.14 **Significance of effects**

16.14.1 With the implementation of the mitigation measures, the likelihood of dust generation impacting on existing sensitive users would be low to negligible and would result in no significant environmental effects.

16.14.2 Due to the separation distances between the construction zones and sensitive receptors there would be no adverse environmental effects due to dust soiling or particulate matter effects for earthworks and construction.

16.14.3 With mitigation deployed, the impact to existing sensitive users would be negligible and exceedance of the short term or long term Air Quality Objectives is not predicted to occur.

16.14.4 The mitigation outlined in the CEMP would also be applied to the decommission phase (updated as necessary at the time). Dust arising in the decommission phase is predicted to be negligible and not significant.

16.15 **Cumulative impacts**

16.15.1 There are no other developments proposed to be built in the vicinity of the Proposed Development. Therefore, there will be no cumulative air quality or dust impacts during the construction span of the Proposed Development. During the operational lifespan of the wind farm, there would be no adverse air quality or dust impacts created to impact upon any future cumulative scenarios.

16.16 **Residual effects**

16.16.1 Step 4 of the IAQM Construction Guidance construction phase dust assessment has been undertaken to determine the significance of the dust effects associated with the Proposed Development.

16.16.2 The implementation of effective mitigation measures during the construction phase, as outlined in the CEMP, would substantially reduce the potential for
dust and particulate matter to be generated and there would be no residual impacts associated with the Proposed Development.

16.17 Summary and Conclusions

16.17.1 The construction phase dust assessment has been undertaken in accordance with the guidelines and assessment criteria as outlined in the IAQM Construction Guidance\(^1\) and PAN 50\(^2\). The following assessment criteria have been adhered too:

- IAQM Construction Guidance: up to 350m for earthworks and construction and 50m width of a 500m construction route for trackout.
- PAN 50: assessment of borrow pits up to 500m from the dust source.

16.17.2 The majority of construction activities associated with the Proposed Development would occur up to 2.5 km from the nearest existing sensitive receptors. The only construction activity capable of causing dust soiling and human health effects is trackout at the existing site access. The existing site access for the adjacent Cruach Mhor Wind Farm would be utilised by the Proposed Development. New access route construction is up to 2.5 km from the nearest sensitive receptors.

16.17.3 Two existing sensitive receptors were selected to the north and south of the existing site access entrance on the A886. These receptors were assessed for both dust soiling and human health effects from particulate matter.

16.17.4 The air quality assessment has predicted that the dust soiling and human health effects associated with trackout are low. As the requirement for assessment at earthworks and construction was screened out, it is considered the risk of effects from those activities is negligible and not significant.

16.17.5 Dust mitigation measures will be undertaken during the construction phase and decommissioning phases of the Proposed Development. Dust mitigation measures are outlined in the accompanying Construction Environmental Management Plan.

16.17.6 The implementation of specific dust mitigation for the Proposed Development would result in negligible and not significant impacts at existing sensitive receptors for both the construction and decommissioning phases of the Proposed Development.

16.18 References


Arup Environmental/ Ove Arup and Partners, on behalf of the Department of the Environment (December 1995). The Environmental Effects of Dust from Surface Mineral Workings, HSMO 1995
Department for Environment, Food and Rural Affairs 2016. Local Air Quality Management Technical Guidance


Environmental Protection UK and Institute of Air Quality Management Land-Use Planning and Development Control: Planning for Air Quality 2017


Scotland’s Third National Planning Framework 3 (NPF3)

The Air Quality (Scotland) Amendment Regulations 2002. Scottish Statutory Instrument No.297

The Air Quality (Scotland) Regulations 2000. Scottish Statutory Instrument No.97

The Air Quality Standards (Scotland) Regulations 2010. Scottish Statutory Instruments No. 204

The Scottish Office Development Department Planning Advice Note PAN 50 Annex B Controlling the Environmental Effects of Surface Mineral Workings, The Control of Dust at Surface Mineral Workings 1998