# AGENDA ITEM 6

# APPENDIX 5

# 2018/0151/DET

# AIR QUALITY ASSESSEMENT

# Chapter 7.0
# Air Quality Assessment

# AIR QUALITY ASSESSMENT

## 1.1 Introduction

This chapter considers the potential impacts of the proposed development on air quality which primarily relates to nuisance resulting from airborne dust generation.

Dust is the generic term used to describe particulate matter in the range 1-75µm in diameter. The process by which dust becomes airborne is referred to as dust emission. There are two distinct processes by which dust may become airborne.

- Saltation (or particles jumping across surfaces).
- Suspension of particles and their entrainment in airflow.

The potential for dust to arise from mineral extraction is often a matter of public concern. It is a fear that proposed extraction will result in a regular and persistent nuisance which will affect residential amenity and people's quality of life.

Guidance upon controlling dust from these activities is provided by Planning Advice Note 50, Annex B "The Control of Dust from Surface Mineral Workings". In considering dust, reference has been made to Planning Advice Note (PAN) 50 Annex B – "The Control of Dust at Surface Mineral Workings", and the Department of the Environment Publication "The Environmental Effects of Surface Mineral Workings".

These guidance documents acknowledge that the relationship between activities carried out at mineral sites to surrounding land uses will vary from site to site, affected by local topography, site design and meteorological conditions. Furthermore, it is recognised that the sensitivity of dust and the perceptions of whether the effects of dust constitute a nuisance will differ.

The document also indicates that in general terms large dust particles (greater than 30 µm) are likely to travel up to 250-500 metres and smaller particles, which make up a small proportion of dust emitted from most workings, can travel up to 1km. However, dust dispersion patterns are difficult to predict due to the uncertain influences of wind.

## 1.2 Potential Sensitive Receptors

PAN 50 Annex B provides examples of neighbouring land uses and their sensitivity to dust. These are detailed in Table 1.

**Table 1: Land use Sensitivity**

| High Sensitivity | Medium Sensitivity | Low Sensitivity |
|---|---|---|
| Hospitals and clinics | Schools | Farms |
| Retirement homes | Residential areas | Light and heavy industry |
| Hi-tech industries | Food retailers | Outdoor storage |
| Painting and furnishing | Glasshouses and nurseries | |
| Food processing | Horticultural land | |
| | Offices | |

The publication entitled "The Environmental Effects of Dust from Mineral Workings" (HMSO 1995) provides advice as to how the risk of dust sensitivity is affected by distance. The report advises that receptors with a stand-off of less than 100m to a minerals development are considered as being the highest risk in terms of dust sensitivity, receptors 150-200m away as being of medium risk and receptors from 200-250m to dust emitting sources have a low risk of dust sensitivity.

Table 2 below lists the receptors which are located in the vicinity of future proposed quarrying. The quoted distances represent the closest approach of quarrying.

**Table 2: Property Distances**

| Property | Distances | | Direction from the Site |
|---|---|---|---|
| | At Closest Advance of the Proposals | At Furthest Distance Away From the Proposals | |
| Dalwhinnie Distillery Residential Properties | 703m | 897m | South |
| Dalwhinnie Distillery | 742m | 970m | South |
| Heatherlea Cottage | 875m | 1.14km | South West |
| Allt An't Sluic Lodge | 1.07km | 1.25km | West |

The residential properties are identified as being medium sensitive receptors, whilst the distillery is considered to be of high sensitivity. Furthermore, taking into account distance none of the identified receptors are considered to be at risk of dust sensitivity.

## 1.2 Site Meteorology, Topography & Vegetation

The potential for the Site to emit dust is significantly influenced by the meteorological conditions and topography.

Rainfall decreases dust emissions as a result of both surface wetting and the increased rate at which dust is removed from the air. Rain-free days are defined as days with less than 0.2mm of precipitation. Rainfall above 0.2mm per day is considered sufficient to effectively suppress wind blown dust emissions, although all dry days may not cause dust generation since cold day winds following wet conditions may not lead to significant drying of the surface.

In terms of topography, open exposed sites which lack shelter and surface features are more susceptible to wind blow. In contrast sites where quarrying operations are contained within the bowl of the quarry void are protected from wind by the quarry faces and soil storage bunds are less susceptible.

Wind speed and direction also affect the potential for dust to affect a receptor with the receptors down wind of a source of dust being at far greater risk of impact.

Conditions likely to cause deposition of a dust nuisance will therefore include:

- Receptor downwind of dust source.
- Drying conditions e.g. rainfall/wind.
- Windspeed sufficient to pick up and/or transport dust particles.
- Lack of physical barrier such as woodland or topography

For the purposes of this assessment rainfall data is available at Dalwhinnie weather station until 2010. A period of 29 years (1981-2010) has been monitored and the annual rainfall recorded was 1304mm. In addition it has also been recorded that on average there were 183.6 days where the days of rainfall were greater than 1mm. As mentioned above, 0.2mm of rainfall per day is considered to effectively suppress windblown dust nuisance.

No wind speed statistics are available for Dalwhinnie, therefore an average has been taken of the data recorded at Tulloch Bridge and Aviemore, using data provided by windfinder.com. The average windspeed for the area is 6kts, with the prevailing wind from the south south west. Whereas the closest dust sensitive receptors are located 703-875m to the south of the Site, when the proposals are at closest approach to the properties. In later phases, as the quarry advances north and eastwards, these distance will increase to between 897m and 1.14Km. As a result there are likely to be a limited number of occasions on which the wind will be in a direction which could give rise to dust impacts from the Site at these locations.

Based on the data above and distances to the nearest properties there will be a significant proportion of the year where the conditions do not exist for the propagation of wind blown dust.

In terms of topography the proposals have been designed to ensure all dust emitting activities are undertaken within the bowl of the quarry. This will significantly assist by providing a physical barrier helping to contain any dust emissions within the Site.

### 1.3 Potential Dust Sources and Mitigation

Most activities associated with mineral extraction have the potential to create dust. Although the potential for dust impacts at the Site is limited by receptor sensitivity/distance, rainfall and wind direction, without appropriate mitigation there will be occasions when conditions result in the potential for dust generation. Potential sources of dust generation have been considered and mitigation measures proposed for the Site. Potential Sources of dust emission are as follows:

- Soil stripping, storage and site restoration.
- Mineral extraction and processing, including drilling and blasting.
- Internal and external road haulage.
- Storage of product.

*Soil Stripping and Storage/Site Restoration Works*
The possibility of dust being raised associated with soil stripping works is limited because the soil at the Site has a high organic content which aids moisture retention and as a consequence the soil will tend to remain damp during stripping. This should ensure that even during periods of prolonged dry spells dust emanations from soil stripping activities will not propagate for any significant distance.

Potential exists for dust propagation from soils stored on Site following stripping. Vegetation stripped from the Site will be used to cap the outer face of the soil storage bunds in order to reduce the risk of dust pick up due to wind blow. Further mitigation will be provided with the bunds being seeded as soon as practicable following construction.

With regard to restoration, the Site will be restored in accordance with the submitted plans. The soil and overburden material will be used to dress off the slopes within the quarry void in order to provide a rooting medium for vegetation to become established. The replacement and treatment of overburden, subsoil and topsoil will have the potential to generate dust for a limited period of time but with appropriate handling, the impact will be similar to that from agricultural activities.

*Mineral Extraction and Processing including Drilling and Blasting*
Mineral extraction and the processing of the raw material has the potential to generate dust however, the following dust minimisation techniques will be used in relation to these activities:

- Use of drill rigs fitted with air filtration system.
- Dust suppression in the form of water sprays are fitted to screening plant. All water sprays on plant will be regularly checked to ensure they are operating correctly. Water for dust suppression will be sourced from the quarry sump.
- The drop heights into vehicles and hoppers will be kept to a minimum.
- The discharge height from conveyors will be kept to a minimum. Skirts will be fitted to all conveyors to reduce wind blown emission.
- Mobile plant exhausts and cooling fans to point away from ground.

*Internal and External Road Haulage*
In order to minimise impacts the following mitigation measures will be used:

- All internal haul routes as well as the Site access will be maintained in a damp condition during dry weather through the use of water sprays/bowser, with the frequency of water application dictated by the degree of usage and weather conditions.
- Vehicles speeds will be controlled to prevent dust arising from the passage of vehicles along the haul roads and surfaced areas.
- The Site access will be regularly inspected to ensure that no debris has been trafficked onto the public highway with a road sweeper used as necessary to keep the public highway clear.
- All haulage vehicles carrying dust prone materials departing the Site will be sheeted to prevent spillage and windblow.

With the use of proper site management dust potential from this activity is considered to be negligible.

*Storage of Product*
A potential of wind blown dust arising from stockpiles is due to the exposed surface of the stockpile itself and the loading of material with a high dust potential and / or low moisture content.

Stockpiles of material will therefore be situated within the quarry void and formed such that wind entrainment is minimised. This can be achieved by their careful siting to take advantage of any screening provided by the quarry bowl and by profiling the stocks so that wind passes over them.

## 1.4 Vehicle and Plant Emissions

*PM10*
The policy on air quality is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland July 2007. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. Several of the objectives in the AQS are made statutory In Scotland by the Air Quality Standards (Scotland) Regulations 2010.

The Air Quality (Scotland) Amendment Regulations 2002 defined the air quality objectives with an annual mean concentration for PM10 is not to exceed 18 µg/m³ and a 24hour mean not to exceed 50 µg/m³ more than 7 times a year.

The background PM10 data from 2015 for the site area has an average PM10 concentration of 5.273µg/m³. The maximum background concentration for PM10 is 5.348µg/m³.

The background PM10 data from 2015 for the Dalwhinnie area has an average PM10 concentration of 5.471µg/m3. The maximum background concentration for PM10 is 5.701µg/m³.

To ensure worst case scenario, following reopening of Dalwhinnie quarry a process contribution of 5µg/m3 for PM10 has been applied based on the guidance given in Local Air Quality Management Technical Guidance LAQM.TG(03), DEFRA 2003.

This results in a maximum Predicted Environmental Concentration of 10.348 µg/m³ in the area where the quarry is located and a maximum Predicted Environmental Concentration of 10.701 µg/m³ in Dalwhinnie Village.

With the low background concentrations of PM10 in the Dalwhinnie area, the operations proposed at the quarry and the rock type being extracted, there is very little potential for site operations to cause a breach of either the 24-hour or annual objectives for PM10.

*Vehicle Emissions*
The vehicles and plant used within Dalwhinnie quarry will be diesel powered. Improved fuel quality standards and European vehicle emission limits have helped reduce the emissions from diesel engines as fitted to HGV's and quarry plant. Quarry plant is increasingly being fitted with diesel particulate filters and fuel additive systems to aid the reduction in emissions. All plant is maintained to a high standard in accordance with the manufacturers' recommendations.

## 1.5 Conclusions

In conclusion receptor distance/sensitivity, local topography, and the meteorological conditions at this locale, minimise the potential for dust impacts to result from the proposed development. This together with the employment of best practice methodology will ensure impacts are minimised as far as practicable.

The PM10 assessment has concluded that there is very little potential for site operations to cause a breach of either the 24-hour or annual objectives for PM10.

As a result overall impacts upon air quality has been assessed as **minor**, therefore all residual effects are considered to be **not significant** in the context of EIA guidance.