SUBMISSION FOR REVIEW OF MINERAL PLANNING PERMISSION DA/97/1140C

LAND AT BOUGHTON-PITSFORD-MOULTON, NORTHAMPTONSHIRE

PETER BENNIE LIMITED AND TATA STEEL UK LIMITED
CONTENTS

1 Introduction ...................................................................................................................... 3
2 Scope of the Assessment .................................................................................................. 3
3 Proposed Development ..................................................................................................... 4
  3.1 Existing Operations ......................................................................................................... 4
4 Site Setting ....................................................................................................................... 4
  4.1 General Description ........................................................................................................ 4
  4.2 Potentially Sensitive Receptors .................................................................................... 5
5 Planning Policy .................................................................................................................. 5
  5.1 National Planning Policy ............................................................................................... 5
  5.2 Local Planning Policy ..................................................................................................... 5
6 Baseline Conditions ........................................................................................................... 6
  6.1 Air Quality ....................................................................................................................... 6
  6.2 Dust Deposition ............................................................................................................... 6
7 Dust Monitoring ................................................................................................................ 6
8 Wind Speed and Direction ................................................................................................ 9
9 Standards and Controls .................................................................................................... 10
  9.1 Dust Deposition ............................................................................................................. 10
  9.2 Planning Controls .......................................................................................................... 10
  9.3 Local Air Pollution Prevention and Control (LAPPC) .................................................. 11
10 Assessment of Impacts ................................................................................................. 11
  10.1 General Observations ................................................................................................. 11
  10.2 Sources of Dust ............................................................................................................ 12
  10.3 Site Assessment .......................................................................................................... 13
  10.4 Fine Particulates ......................................................................................................... 15
11 Mitigation ....................................................................................................................... 16
12 Residual Impacts ............................................................................................................. 17
13 Cumulative Impacts ....................................................................................................... 17
14 Conclusion ....................................................................................................................... 18

APPENDICES

APPENDIX 1: Approved Dust Monitoring Scheme
APPENDIX 2: Monitoring Results Table
APPENDIX 3: Wind Roses for Bedford
1 Introduction

1.1.1 Peter Bennie Ltd operates the sandstone quarry known as Pitsford Quarry, to the north of Northampton and south of Pitsford village. There is a requirement for a review of the modern conditions of working (ROMP), which were issued in 1998, one of which relates to the monitoring of dust.

1.1.2 An Environmental Statement (ES) will be submitted with the submission of the ROMP. The Scoping Opinion dated 11 October 2013 issued by Northamptonshire County Council includes a requirement for the assessment of dust from continued mineral extraction operations. This report details the dust assessment. This assessment relates only to the area of Phase 1 and the associated site compound and haul road, as shown on Drawing GPP/PB/PR/13/09. All other areas within the old mineral planning permission are to be treated as dormant and will be assessed in connection with any application in the future to bring forward future phases of working.

2 Scope of the Assessment

2.1.1 The assessment considers the effects of airborne dust and fine particulates associated with continued working of the quarry. It is based on work undertaken by the Smith Grant Partnership during the operation of the quarry.

2.1.2 In undertaking the assessment the following activities were carried out:
- site visit to view the existing workings and the proposed extension,
- walkover of the surrounding area to view the site setting,
- review of baseline air quality,
- review of dust deposition monitoring,
- review of wind speed and direction data for Bedford,
- review of standards and controls,
- assessment of impacts due to dust and fine particulates,
- recommendations for mitigation,
- assessment of residual impacts,
- assessment of cumulative impacts.

2.1.3 Residents’ concerns are most likely to be experienced within 100m of the dust source. Adverse impacts due to dust from sandstone quarries are uncommon at distances greater than 250m and therefore, only potential receptors within this distance from the site boundary are considered.

2.1.4 The assessment also considers the likely impact of dust on ecological receptors and historic assets.
3 Proposed Development

3.1 Existing Operations

3.1.1 The operations at the quarry involve the extraction of moderately soft sandstone to create building stone and aggregate. Extraction, when it recommences will take place in a northerly direction towards Pitsford, within the area of Phase 1. The remaining reserves in this area are predicted to last for 3-5 years.

3.1.2 The sandstone remaining is the lowest strata, which rests on the underlying clay. It is generally at a depth of 3m.

3.1.3 A hydraulic excavator is used to extract the sandstone, which is then broken into a suitable size for the market. A wheeled loading shovel is used to transfer the building stone into the compound for processing or into lorries for transport off site for processing. Sandstone that is unsuitable for the market is loaded into mobile crushing and screening plant on the quarry floor. The crushed aggregate is stored on the quarry floor in heaps of different grades until it is transferred to lorries by wheeled loading shovel for transport off site.

3.1.4 The lorries transport sandstone and crushed aggregate from the quarry floor to the site access, which is located along the A508 Northampton to Market Harborough road. The lorries travel along the site haul road, which runs through the now established community woodland. The haul road is surfaced with tarmacadam and vehicles pass through a passive wheel wash in the site compound before travelling along the access road. The wheel wash comprises a water trough with ramps on either side.

3.1.5 Once quarrying operations recommence, it is likely that the output will be a maximum of 30,000 tonnes per annum, which will generate 20 HGV movements per day on average.

3.1.6 The haul road is swept periodically to prevent the trackout of mud and debris onto the public highway. A road sweeper is used in the event that mud is tracked out onto the public highway during wet conditions.

3.1.7 An aggregate recycling facility within the area of Phase 1 was granted planning permission, together with the filling of Pitsford Pond. This scheme is included in this assessment, as it relates to cumulative impacts.

4 Site Setting

4.1 General Description

4.1.1 The active Phase 1 quarry area, with associated haul road and compound, is surrounded by agricultural land to the west, south and east, with the established community woodland to the north and on either side of the haul road. The land within Phase 1 generally slopes downhill to the south, lying on the northern side of the stream valley. The site is shown in its context on Drawing GPP/PB/PR/13/03.
4.2 Potentially Sensitive Receptors

4.2.1 The village of Pitsford is situated to the north of the site at a distance of over 750 to the centre and the village of Boughton is situated to the south of the site at a distance of over 1km to the centre. Boughton Park lies close to the haul road and the western boundary of the Phase 1 extraction area. There are a number of individual residential properties nearby, including Home Farm, The Oaks, Fox Covert Hall and Farm and Bunkers Hill Farm complex. A small woodland along the northeast site boundary provides partial screening from the site at these properties.

4.2.2 A public footpath runs in a south to north direction alongside the extraction area, but separated by a large soil bund, constructed using the soils stripped during preparation of the area for mineral working over 10 years ago. The footpath joins the minor roads to the north and south of the site.

4.2.3 The locations of the sensitive receptors are shown on Site Context Plan Drawing GPP/PB/PR/13/03.

4.2.4 The area of T’s Wood and the existing quarry has been listed as a Local Wildlife Site, which may be sensitive to the generation of dust from quarrying operations.

5 Planning Policy

5.1 National Planning Policy

5.1.1 The main national guidance is included in the Technical Guidance to the National Planning Policy Framework (NPPF).

5.2 Local Planning Policy


5.2.1 Local policy in respect of dust from mineral workings is set out in Policy CS14.

Policy CS14: Addressing the impact of proposed minerals and waste development

Proposals for minerals and waste development must demonstrate that the following matters have been addressed:

- minimising environmental impact and protecting Northamptonshire’s key environmental designations,
- protecting natural resources or ensuring that any unavoidable loss or reduction is mitigated,
- ensuring built development is of a design and layout that has regard to its visual appearance in the context of the defining characteristics of the local area,
- ensuring access is sustainable, safe and environmentally acceptable, and
- ensuring that local amenity is protected.
6 Baseline Conditions

6.1 Air Quality

6.1.1 The Air Quality (England) Regulations 2000 (AQR) prescribe National Air Quality Strategy (NAQS) objectives to be achieved for a range of key pollutants. Under AQR, local authorities are required to review the existing and projected airborne concentrations of these pollutants and to compare them with the NAQS objectives. If an exceedence of any NAQS objective appears likely, then an Air Quality Management Area (AQMA) is to be designated with the objective of achieving the standard by the due date.

6.1.2 The pollutant of most concern in connection with the quarry extension (and the area identified for future mineral extraction) is particulate matter less than 10µm in diameter (PM10).

6.1.3 There are no designated Air Quality Management Areas in Daventry District. The District Council’s Air Quality Progress Report of 2011 did not consider PM10s as an Updating and Screening Assessment undertaken for the Council in 2006 by Bureau Veritas concluded that the air quality objectives for PM10s will be met and there would be no requirement to undertake a detailed assessment of this pollutant.

6.2 Dust Deposition

6.2.1 Typical dust deposition rates for rural areas range between 10 and 50 mg/m²/day (Environmental Effects of Surface Mineral Workings, Department of the Environment, 1991). The presence of traffic on the adjacent A508 and agricultural operations suggest that dust deposition rates in the area may lie in the middle of this range, ie, about 30 mg/m²/day.

6.2.2 Dust deposition monitoring was carried out around the quarry when it was operational to measure dust deposition rates.

7 Dust Monitoring

7.1.1 Dust deposition monitoring was undertaken from August 2001 until February 2004, in accordance with the approved scheme prepared by the Smith Grant Partnership (SGP). This scheme is set out in the first dust monitoring report, of March 2002; a copy of the report is included in Appendix 1. In August 2001 four combined deposit / direction gauges were installed under supervision by SGP at the locations shown in Drawing R209-01. The monitoring programme was drawn up in accordance with the Best Practice Guide, Dust Monitoring, appended to The Environmental Effects of Dust from Surface Mineral Workings, HMSO 1995.

7.1.2 Each combined gauge comprised a “frisbee” deposition gauge with a collecting bottle around which a directional adhesive strip was fixed. The analyses of dust samples from the combined gauges were reported in terms of deposition rates for undissolved and dissolved solids (mg/m²/day), pH and daily percentage effective area coverage, essentially a measure of soiling, in eight sectors. The reporting of effective area coverage around the site allowed an assessment to be made of the main direction(s) from which the collected dust arose. The data
were used to ascertain whether the quarry operations were having an impact on dust deposition rates in the vicinity of the quarry.

7.1.3 Samples were collected at monthly intervals by TES Bretby, on behalf of SGP, and were analysed at their UKAS-accredited laboratories.

7.1.4 In March 2003 some of the monitors were moved, as the working area progressed; the locations are shown on Drawing R209-02. Again in December 2003 the monitors were moved; the new locations are shown on Drawing R209-04. The plans are included in the Dust Monitoring Scheme report in Appendix 1.

Results

7.1.5 The tabulated dust test reports are attached as Appendix 2. An analysis of the results is discussed below.

Interpretation

7.1.6 The following summary of the results up to the end of March 2003 was prepared by SGP in response to a request from the members of the Quarry Liaison Committee at its meeting on 23 September 2002. The summary is quoted below:

Dust deposition monitoring has been carried out at Pitsford Quarry since August 2001. Data were collected during the site preparation works for five months at Stns 1 and 2, and for two months at Stns 3 and 4. Monitoring has continued at all four stations since extraction commenced in Phase 1 in February 2002. Stns 1, 2 and 4 were re-located shortly after the onset of extraction to provide effective coverage of the operational area. The results obtained for the extraction period are summarised in the following table.

Stn 1 was located towards the northwest boundary of Phase 1 during the site preparation works, but was moved about 100m to the west once extraction commenced and now lies between the site compound and The Oaks. Stn 2 was originally located on the southern side of the access road, but was moved to the southeast corner of Phase 1. Stn 3 is located to the west of the site compound, close to the site boundary. Stn 4 is currently located on the northern side of the access road close to Home Farm, but was located about 250m further east during the site preparation works.
Table 1: Summary Dust Data - Phase 1 Extraction

There are no UK statutory or recommended dust deposition rates which constitute an acknowledged nuisance. However, it is generally accepted that nuisance may occur if the total solids deposition rate exceeds 200 mg/m²/day on a sustained basis at a potentially sensitive property.

Since extraction commenced, dust deposition rates have on separate occasions been elevated at each of the four monitoring locations. At Stns 1, 2 and 4, the average total solids deposition rates ranged between 96 mg/m²/day at Stn 1 and 117 mg/m²/day at Stn 2. At Stn 3 the average total solids deposition rate since extraction commenced was 335 mg/m²/day.

The maximum daily effective area coverage rates, essentially a measure of soiling, were on occasion elevated at all stations during both the preparatory works and extraction, with a recorded maximum of 2% from the south at Stn 3. A rate of 0.5% per day is considered to represent the onset of possible nuisance conditions if experienced at a sensitive receptor.

The direction data indicate that the principal sources of dust were the haul route, the access road in the vicinity of the site compound and the general area of the site compound itself. Some dust, but at lower levels, was also raised from within the current extraction area and further along the access road towards the junction with the A508. It is however apparent that a proportion of the dust recorded was not associated with the site and arose from off-site sources, possibly due to agricultural activity in neighbouring fields. During the monitoring period 19 November to 19 December, 2001, a general regional dust source was identified which contributed to both the deposition and soiling rates during that period.

One complaint relating to airborne dust has been received from the occupants of Fox
Covert Hall which lies about 200m west of Phase 1.

In response to the monitoring data and the complaint, work has recently been undertaken at the site to increase the area of the tarmaced surface in the vicinity of the site compound and to increase the width of the site access road in order to prevent site traffic from generating dust by travelling across unmade ground.

Overall, the data indicate that dust deposition and soiling rates have on occasion been elevated since extraction at the site commenced. In response to the monitoring results obtained to date, measures have been taken aimed at reducing dust emissions from the site. Monitoring is ongoing, and will identify whether further mitigation is necessary in the future.

8 Wind Speed and Direction

8.1.1 Wind roses for the weather station at Bedford, which lies about 35km southeast of the quarry, for the ten years between January 1984 and December 1993, show wind speeds and directions for the whole year and for the summer season when conditions tend to be drier and potentially dustier. The windroses are contained in Appendix 3. Data derived from the wind roses are summarised in the following table.

Table 2: Summary Wind Data, Bedford Weather Centre

<table>
<thead>
<tr>
<th>Direction</th>
<th>Annual percentage occurrence</th>
<th>Summer percentage occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All winds</td>
<td>Winds &gt;10 knots</td>
</tr>
<tr>
<td>N</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>NE</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>SE</td>
<td>6</td>
<td>1</td>
</tr>
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<td>S</td>
<td>13</td>
<td>5</td>
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<td>SW</td>
<td>26</td>
<td>11</td>
</tr>
<tr>
<td>W</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>NW</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Calm / variable</td>
<td>0.5</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: “All winds” totals do not equal 100 due to rounding

8.1.2 The data show that, as an annual average, winds predominate from the south, southwest and west, accounting for 56% of all winds. The wind frequencies in each of the remaining 45° sectors range between 5 and 12% annually.

8.1.3 Winds of more than 10 knots occur for 34% of the time annually. Wind speeds in excess of 10 knots are important as they lead to the onset of potentially significant airborne dust emissions due to wind blow across bare ground and stockpiles.

8.1.4 During the summer months, taken as from June to August, the wind directions vary slightly, with a small increase in the frequency of winds from the southwest, west and northwest and a corresponding decrease in the frequency of winds from the north, northeast and south. There
is a reduction in the overall frequency of winds greater than 10 knots.

9 Standards and Controls

9.1 Dust Deposition

9.1.1 Human reaction to airborne dust can relate to the rate of deposition and/or to the level of dustiness. Nuisance is likely to occur when the coverage of smooth surfaces is visible in contrast with clean areas, especially when it happens regularly. Severe nuisance may be alleged if dust is perceptible without reference to a clean surface.

9.1.2 There are no UK statutory or recommended dust deposition rates which constitute an acknowledged nuisance. The possible onset of nuisance from a particular source is generally considered to occur when dust deposition becomes noticeable, typically at a level which is 2 - 3 times background levels.

9.1.3 With a suggested baseline deposition rate of about 30 mg/m²/day, as indicated by the results of the dust monitoring exercise, the possible onset of nuisance at a residential property in the vicinity of the quarry may therefore occur if the deposition rate for undissolved solids exceeds about 100 mg/m²/day. This is half the rate of 200 mg/m²/day above which level the need for cleaning is said to become excessive and which has been previously accepted as a standard or guideline by some Mineral Planning Authorities (MPAs).

9.1.4 The onset of nuisance due to soiling is also generally considered to occur when the daily effective area coverage exceeds 0.5% at a sensitive property.

9.2 Planning Controls

9.2.1 Planning consents for surface mineral workings and associated activities feature conditions to prevent or control environmental impacts. Invariably, these now include conditions relating to airborne dust. Although a dust deposition rate has been suggested below which it is unlikely that dust will constitute a nuisance, current guidance is to the effect that it is inadvisable to set definitive standards or guidelines by condition. The essence of the guidance is the control of dust emissions through good site management.

9.2.2 Accordingly, it is the practice of MPAs to set conditions relating to the control of dust at source. Typically, modern conditions include a requirement to submit for approval a scheme of measures for the management of dust emissions. MPAs may also require the submission of a programme for monitoring dust emissions.

9.2.3 Typical dust controls for quarry operations accord with the recommendations provided in PGN 3/8 (04), Process Guidance Note 3/8 (04), Secretary of State’s Guidance for Quarry Processes, DEFRA, 2004. Where mobile crushing and screening plant is used, typical controls accord with the recommendations provided in PGN 3/16 (04), Process Guidance Note 3/16 (04), Secretary of State’s Guidance for Mobile Crushing and Screening, DEFRA, 2004.

9.2.4 These controls will afford the MPA the opportunity of ensuring that adequate measures are taken to control and mitigate the impacts of airborne dust beyond the site boundaries at all
stages in the life of the proposed quarry extension.

9.2.5 The existing operations are subject to Planning Permission No. DA/97/1140C issued by the MPA, Northamptonshire County Council, in 1998. The Permission includes one condition relating to the emission of airborne dust, as set out below:

27. The monitoring of the dust control arrangements as set out in the submitted Working Plan as amended in accordance with the requirements of this schedule of conditions shall be carried out in accordance with a phased scheme to be submitted prior to the extraction commencing and approved by the County Planning Authority.

9.2.6 The monitoring requirements of Condition 27 have been fully implemented and the results described in Section 6. No regulatory action has to date been taken against the quarry with regard to this condition, indicating that compliance with the condition has been achieved.

9.3 Local Air Pollution Prevention and Control (LAPPC)

9.3.1 The mobile crushing and screening plant as used at the quarry is subject to LAPPC permits (Permit Nos. 13/1 – 13/6). Conditions attached to the permits for the control of dust accord with the relevant Secretary of States Guidance Note, PG3/16(04).

9.3.2 This guidance is based upon the use of best available techniques not entailing excessive cost (BATNEEC) and is effective in ensuring that nuisance due to airborne dust is not caused. LAPPC permits are reviewed at least once every 6 years and may be modified to take account of the actual performance of the site, technological advances or an increased awareness of the impact of a particular process.

10 Assessment of Impacts

10.1 General Observations

10.1.1 Airborne dust occurs when fine particles are disturbed and loosened by physical activity such as breaking, excavating, loading and transport, or by an airstream passing over such materials. It is generally accepted that winds of more than 10 knots across loose fine materials can cause windblown dust emissions.

10.1.2 Light winds will transport fine particles already suspended in the atmosphere due to disturbance. In calm conditions, any raised dust tends to settle out in the vicinity of the source. In windier conditions, the dust may be carried for a greater distance before settling out. The distance the dust will be carried depends on the wind speed, the particle size, the topography of the site and its surroundings.

10.1.3 Guidance (The Environmental Effects of Dust from Surface Mineral Workings, HMSO, 1995) states that large dust particles, greater than 30 \( \mu \text{m} \), which constitute the greatest proportion of dust emitted from mineral workings and associated processes, will largely deposit within 100m of the source. Finer particles, which constitute a small proportion of the dust emitted from most operations, are only deposited slowly, although their concentrations decrease rapidly from the source due to dispersion and dilution.
10.2 Sources of Dust

10.2.1 The principal potential sources of airborne dust associated with extraction and restoration include:
- soils handling,
- mineral extraction,
- loading and tipping,
- crushing and screening,
- site haulage,
- road transport,
- wind blow across stockpiles and soils bunds, and
- wind blow across stripped areas and other areas of bare ground.

10.2.2 The silty, sandy soils within the quarry may give rise to airborne dust during restoration operations, particularly as they should be handled in a dry friable condition. The magnitude of any impacts will be reduced by the short duration of soils handling in any one season. The subsoils within the area are more clayey in nature and are therefore, less likely to give rise to airborne dust.

10.2.3 The extraction of sandstone by hydraulic excavator is unlikely to result in significant dust emissions. Workings will be below ground level, therefore the extraction of sandstone and associated activities will be sheltered from the effects of wind. Some dust may be raised as the sandstone is crushed into marketable size. However, any dust raised will tend to be contained within the sheltered quarry void. This is corroborated by the results of the dust deposition monitoring which indicate that only low levels of airborne dust are generated from mineral extraction and associated activities at the existing quarry.

10.2.4 Loading and tipping operations are generally unlikely to result in significant emissions of dust, due to the shelter provided by the quarry void. This is corroborated by the results of the dust deposition monitoring.

10.2.5 The use of crushing and screening plant has the potential to raise dust into the atmosphere although PGN 3/16(04) states that “proper site management and use of environmental controls can create a site that is substantially free from airborne particulate emissions due to the process”. The dust deposition monitoring data set out in section 6 of this report indicate that the operation of the screen and crusher and other quarry operations were not causing significant dust emissions. This is likely to be a result of the sheltering effect provided by the quarry void and screening bunds. The sandstone is also moderately soft and therefore dust emissions tend to be less than those that might arise from the crushing of harder stone. As the crushing and screening plant will be located below ground level, significant dust emissions are unlikely.

10.2.6 Site haulage is typically the greatest dust source on surface mineral sites. The impact is increased over longer distances when speeds tend to be greater and more effort is required to maintain a smooth damp running surface. The site is well served by a surfaced haul route to the access onto the A508. The output in the future will be similar to the output when the quarry was operational and therefore, the number of vehicle movements will also remain the same. Consequently, dust emissions from site haulage are likely to be similar to those at that
time. The monitoring data indicates that significant quantities of dust were not being raised by the passage of vehicles on the existing haul road.

10.2.7 Material is also unlikely to be blown from loaded transport as all lorries are required to be sheeted before leaving the quarry.

10.2.8 The stockpiles of crushed and screened aggregate are located within the quarry void and are largely sheltered from the effects of wind. Therefore, the potential for dust emissions is low.

10.2.9 During dry conditions, strong winds may raise wind blown dust from stripped areas and other areas of bare ground. Any emissions will tend to be greatest from the surface of the more sandy soils. Dust may also be raised by strong winds blowing directly at any extraction faces.

10.2.10 In summary, the principal potential dust source associated with the quarry is site haulage. Some dust may also be raised by road transport on the access road. There is a moderate risk of adverse impact due to soils handling and wind blow across stripped or bare surfaces. Provided that the crushing and screening plant is located below ground level within the quarry dust emissions are unlikely. The other potential dust sources are unlikely to be significant.

10.3 Site Assessment

10.3.1 The nearest sensitive receptors, in each direction from the site, are considered below. In addition to these receptors being identified as residential, many of them are also part of the historic heritage of the locality, in the form of Listed Buildings, a Listed Park and Conservation Areas. Therefore, the assessment covers impact on residential amenities and heritage assets.

10.3.2 Dust arises from two sources; fugitive dust from site operations during all wind conditions and wind blown dust, which is generated during high winds. The probability of dust arising from these two sources are considered separately for each wind direction.

**The Oaks, Pitsford Village**

10.3.3 Winds blow from the south and southwest, towards The Oaks, Pitsford Village and agricultural land beyond for 39% of the time annually and for 38% of the time in the summer. Winds greater than 10 knots blow for 16% of the time annually and for 10% during the summer months. Therefore, the probability of fugitive dust is high whilst there is a medium probability of wind blown dust. The Oaks lies at a distance of 175m protected by an existing bund along the north side of the working area and by the established community woodland and a bund on the northern boundary of the woodland. The estimated risk to this property due to dust is low. The village of Pitsford lies over 500m to the north and thus too far removed to be affected by dust. The dust deposition monitoring data indicate that the actual dust levels generated from quarrying activities are low and therefore, the magnitude of the impact will at most be low.

**Home Farm**

10.3.4 Winds blow from the east and southeast, towards the Home Farm complex for 11% of the time, both annually and during the summer. Winds greater than 10 knots blow for 2% of the time annually and for 2% in the summer. Therefore, the probability of fugitive dust is medium and the probability of wind blown dust is negligible. There will be attenuation of dust over the 500m distance between the properties and the working area and 100m between the properties and the haul road. The community woodland between the complex and the working area and
haul road provides an effective screen to dust. Therefore, the magnitude of the impact will be low and the estimated risk to Home Farm due to dust is low.

**Fox Covert Hall and Farm**

10.3.5 Winds blow from the east and northeast, towards Fox Covert Hall and Farm, for 11% of the time both annually and in the summer. Winds greater than 10 knots blow for 2% of the time annually and during the summer months. Therefore, the probability of fugitive dust is medium and the probability of wind blown dust is negligible. At a distance of 225m from the future extraction areas, there will be considerable attenuation of dust and therefore, any impacts are likely to be low. The overall risk due to dust is low.

**Boughton and Boughton Park**

10.3.6 Winds blow from the north and northeast towards Boughton and Boughton Park for 17% of the time annually and 16% of the time in the summer. Winds greater than 10 knots blow for 5% of the time annually and during the summer months. Therefore the probability of fugitive dust is low and of wind blow dust negligible. The landscaped part of Boughton Park is over 450m away and the village over 500m away, therefore there will be considerable attenuation of dust and therefore the impacts are likely to be low and the overall risk due to dust is very low.

**Bunkers Hill Farm Complex**

10.3.7 Winds blow from the northwest towards Bunkers Hill Farm complex for 8% of the time annually and 10% of the time in the summer. Winds greater than 10 knots blow for 3% of the time annually and 4% of the time in the summer. Therefore, the probability of fugitive dust is low and of wind blow dust negligible. The complex lies over 400m away, therefore there will be considerable attenuation of dust and therefore the impacts are likely to be low and the overall risk due to dust is very low.

**Community Woodland**

10.3.8 The Community Woodland and quarry area have recently been designated as a Local Wildlife Site. The active quarry area will soon be worked, therefore the ecological interest relevant to this assessment is within the Community Woodland. Most of the woodland is now well established with grass rides, which will not be adversely affected by dust, as any caught on leaves will be washed off when it rains. The open grassland around the two ponds is grazed by rabbits. Any dust falling on this area will help to maintain a poor soil, which is essential to sustaining the wild flower mix.

**Footpaths**

10.3.9 Footpaths are less sensitive than residential properties to airborne dust and adverse impacts are likely to be experienced only if visible dust is allowed to cross the footpath. Provided that measures are taken to stop dust in the event that it is observed blowing across the footpath along the eastern boundary, the risk to walkers and other users of the footpaths is near zero.

10.3.10 The estimated risks are summarised in the following table.
Table 3: Summary Estimated Risks

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Estimated Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Oaks and Pitsford</td>
<td>Low</td>
</tr>
<tr>
<td>Home Farm complex</td>
<td>Low</td>
</tr>
<tr>
<td>Fox Covert Hall and Farm</td>
<td>Low</td>
</tr>
<tr>
<td>Boughton and the Park</td>
<td>Very Low</td>
</tr>
<tr>
<td>Bunkers Hill Farm complex</td>
<td>Very Low</td>
</tr>
<tr>
<td>Community Woodland/LWS</td>
<td>Very Low</td>
</tr>
<tr>
<td>Footpath</td>
<td>Near zero</td>
</tr>
</tbody>
</table>

10.3.11 Plant habitats sensitive to dust deposition are those where the chemical composition of the dust may affect the acidity/alkalinity (pH) of the ground conditions. Otherwise, dust is washed off plants during wet weather, thus preventing a build up of dust on vegetation, which might affect the rate of photosynthesis and thus the general health of the plant. The established vegetation has grown up on soils that have developed from the same mineral that is to be worked in the quarry. Therefore the dust will be of a similar chemical composition and thus have no adverse effect on the pH of the soil.

10.3.12 In summary, adverse impacts due to dust are unlikely to be caused at any of the receptors.

10.4 Fine Particulates

10.4.1 A DETR / DoH research study, *Do particulates from opencast coal mining impair children’s respiratory health?* (the "Newcastle Study"). The research group investigated the levels of PM10 and health impacts in five pairs of communities, each pair comprising a community close to an opencast coal mine and a control. It was found that, on average, the PM10 levels in communities adjacent to the opencast coal mines were about 2 µg/m³ higher than in the control communities.

10.4.2 A site assessment flow chart from the Newcastle Study requires proposed operators to identify whether there is a community within 1 km of the site and, if so, whether PM10 levels are likely to exceed the NAQS objective. If the objective is not likely to be exceeded then site operations are to be carried out in accordance with good practice. Conversely, if the objective is likely to be exceeded then the significance of the impact is to be assessed. Providing that the impact is not sufficient to justify planning refusal then PM10 monitoring and additional control measures, typically operational restrictions, are to be instituted.

10.4.3 Although the Newcastle Study referred to opencast coal mines, it is suggested that the research recommendations should apply to all types of mineral workings.

10.4.4 In this regard, PM10 emissions from the operations at Pitsford Quarry are likely to be substantially less than those recorded near open cast coal sites. This is due to the sandstone being worked, which is moderately soft and coarse grained compared with the fine-grained rock, common at coal mines, and also to a much smaller requirement for diesel-powered plant.

10.4.5 Any increase in PM10 concentration as a result of the continuation of quarry operations is unlikely to be discernible. Adverse health impacts are unlikely therefore to be experienced as a
result of the continued quarry operations. Monitoring and additional control measures in respect of PM10 emissions will not be necessary.

11 Mitigation

11.1.1 To minimise the potential impacts of dust, future mineral extraction will be operated in accordance with best practice, to control dust emissions by effective site management. Monitoring will continue in accordance with the approved Monitoring Scheme.

11.1.2 The measures for the management and control of dust at the quarry are set out below and are those that were proposed for the operation of the quarry, inert waste recycling and the infilling of Pitsford Pond during consideration of the planning application for these uses.

11.1.3 Daily visual inspections of the site will be carried out by the Quarry Manager, at the start of operations and subsequently as necessary, particularly during dry windy weather, to ensure that all potential or actual dust sources are identified and treated promptly.

11.1.4 As an over-riding requirement, if any operations are identified as causing or likely to cause visible dust emissions across the boundary of the application site, those operations will be modified, reduced or suspended until effective remedial action can be taken or the conditions given rises to the emissions have moderated.

11.1.5 General matters and the management of the site can affect the likelihood of significant dust emissions. These include:

- Use of clean water for dust suppression, to avoid re-circulating fine material;
- High standards of house-keeping to minimise track-out and windblown dust;
- A preventative maintenance programme, including readily available spares, to ensure the efficient operation of dust suppression equipment; and
- Effective staff training in respect of the causes and prevention of dust.

11.1.6 Soil stripping, stockpiling and restoration is generally a short-term seasonal activity and, given the low volumes to be handled, there is considerable flexibility as to its timing. Soils handling will be suspended near the site boundaries when the wind conditions are likely to result in visible dust being carried off-site, particularly across any footpaths. Soil stripping will be programmed sufficiently in advance of extraction to avoid possible conflicts with other operations. Areas of stripped ground and other loose bare surfaces will be watered or treated with a proprietary stabiliser as necessary to minimise the potential for windblown dust.

11.1.7 Freshly-constructed soil bunds will be watered and seeded at the earliest opportunity to bind the surface and minimise the effects of windblown dust.

11.1.8 Loading and tipping heights will be minimised. Wherever possible, loading and tipping operations will take place in sheltered locations within the pond and quarry void, or in the lee of existing mounds and stockpiles.

11.1.9 Standard good practice for site haulage will include:

- The avoidance of abrupt changes in horizontal and vertical alignment by maintenance of the haul road;
- Regular grading and compaction to maintain smooth well-drained surfaces;
- Fitting site vehicles and plant with upswep exhausts and radiator fan shields; and
- Evenly loading vehicles to avoid spillages.

11.1.10 The haul route will be sprayed regularly in dry conditions using a water bowser.

11.1.11 The stone cropping process will take place within a shed at all times to contain any emissions. Should persistent visible emissions result, the process will be carried out under water sprays.

11.1.12 All departing lorries will be inspected, and will be cleaned as necessary, to ensure that track-out is not carried towards the site entrance. All departing lorries will be required to pass through a wheelwash.

11.1.13 A speed limit of 10mph has been set on the access road and signage to this effect has been erected at the site entrance.

11.1.14 The surface of the access road will be damped down and will be maintained as necessary to ensure effective dust control. In the event of track-out being carried onto the public highway, a road sweeper will be deployed to remedy the matter.

11.1.15 A water bowser, fitted with a spray bar or spinner and water gun, will be kept on site and will be deployed as necessary to treat any dry surfaces of the access road, haul road, stockpiles and other areas of loose bare ground. Provision will be made for the rapid filling of the bowser so that it can be used as necessary under all weather conditions.

11.1.16 Should visible dust be blown from any storage mounds or restoration area, the relevant surfaces will be treated with water or a proprietary stabiliser. Final restoration surfaces will be seeded at the earliest opportunity.

11.1.17 The mitigation of emissions of fine particulate matter will be achieved primarily by means of the above dust management and control measures.

11.1.18 The mobile crushing and screening plant will continue to be operated in accordance with the conditions attached to the LAPPC permits and the guidance provided in PGN 3/16 (04).

12 Residual Impacts

12.1 The foregoing standard good working practices and additional mitigation measures are generally accepted by the Government and the surface minerals industry as providing effective control against the impact of airborne dust. With the implementation of these measures, over and above the controls already required by the current planning permission, significant residual impacts are unlikely to occur. Consequently, it is reasonable to conclude that in the event that quarrying operations take longer due to the implementation of the recycling and infilling operations, residual impacts will still be unlikely.

13 Cumulative Impacts

13.1 Quarrying and restoration will be carried out when agricultural activities on adjoining land are being undertaken. There is therefore the potential for both activities to generate dust at the same time. However, experience of working Phase 1 in the past has shown that the combined
effects of the two activities did not lead to significant adverse impacts on either residential amenities or on the wildlife habitats in the locality.

13.1.2 In the event that the quarrying continues alongside the inert waste recycling and infilling of Pitsford Pond, there will be cumulative effects. However, during consideration of the planning application for the additional activities, these cumulative effects were considered and it was demonstrated to the satisfaction of the County Planning Authority that they could be managed by following the Dust Management measures set out in the Mitigation section 11.

14 Conclusion

14.1.1 This assessment has reviewed the relevant matters affecting the probable incidence of airborne dust emissions due to continued mineral working at Pitsford Quarry. Dust deposition monitoring at the quarry indicated that the previous operations did not cause an adverse impact due to dust emissions. Provided that the future operations are carried out in a similar manner as before, adverse impacts due to dust are very unlikely.

14.1.2 There are few sensitive residential receptors within the vicinity of the quarry, with the closest being 65m from the haul road and the next closest 150m from the northern site boundary. With adequate mitigation, working is unlikely to result in adverse dust impacts.

14.1.3 The local wildlife site is not at risk of adverse impacts, as the dust is the same chemical composition as the soil, thus there will be no change to the existing conditions.
APPENDIX 1: Approved Dust Monitoring Scheme
CONTENTS

1 Introduction
2 Site Description
3 Methodology
4 Results
5 Interpretation
6 Recommendations
7 Conclusions

FIGURES

001 Monitoring Stations
002 Revised Monitoring Locations

APPENDIX

A Dust Monitoring Results

Report Author:      Checked:

A D Grant, BSc, MSc, MIMM, CEng   A F Smith, BSc, PhD, MInstWM
1 Introduction

1.1 Peter Bennie Ltd (PB) is extracting ironstone, at Pitsford Quarry, Northants. Operations commenced in Phase 1, to the south of a disused quarry, about 500m south of the village of Pitsford.

1.2 The planning permission for the quarrying operation includes the following in respect of dust monitoring:

27: The monitoring of the dust control arrangements as set out in the submitted Working Plan as amended in accordance with the requirements of this schedule of conditions shall be carried out in accordance with a phased scheme to be submitted prior to extraction commencing and approved by the County Planning Authority.

1.3 The relevant extract of the submitted Working Plan states:

A dust monitoring scheme will be set up, to establish baseline levels of dust in the locality of the site. Dust measurements will be carried out in accordance with a scheme to be prepared and approved by the Mineral Planning Authority during the operation of the site.

1.4 Gill Pawson Planning (GPP), on behalf of Bennie, appointed Smith Grant LLP (SGP) to provide initial advice on an appropriate dust monitoring scheme. This was based on recommendations provided by DoE in the Best Practice Guide, Dust Monitoring, appended to The Environmental Effects of Dust from Surface Mineral Workings, HMSO, 1995. Dust monitoring was then carried out by TES Bretby. SGP were subsequently instructed to provided a short interim report on the results obtained to date.

1.5 This report describes the methodology adopted and details the results of the monitoring programme. Recommendations are provided in respect of the continuing monitoring during quarry operations.

2 Site Description

2.1 Quarrying has commenced in Phase 1 and is progressing in a southerly direction. The mineral is excavated by hydraulic excavator and placed directly into the mobile crushing and screening plant. Towards the end of the working of Phase 1, and for future phases
of working, the mineral will be loaded into dump trucks for haulage to the processing area.

2.2 The mobile crushing and screening plant operates under a Local Air Pollution Control permit issued by Northampton BC. The permit includes various conditions in respect of the control and monitoring of dust emissions, generally as provided in Secretary of State's Guidance PG 3/16(96) - *Mobile Crushing and Screening Processes*.

2.3 Loaded vehicles are sheeted and leave the site via a wheel-wash and an access road which runs west to join the A508 Northampton - Market Harborough road.

2.4 The area is essentially rural with a few isolated properties lying in the vicinity of Phase 1, the processing area and the access road. These are:

- Home Farm, 60m north of the access road,
- The Oaks, 200m north of Phase 1, and 300m northeast of the processing area,
- Bunkers Hill Farm, 400m southeast of Phase 1, and 200m southeast of Phase 2, and
- Fox Covert Hall, 200m west of Phase 1, and 250m southwest of the processing area.

2.5 It is understood that there have been no complaints received in respect of dust emissions from the site.

3 Methodology

3.1 Four combined deposit / direction gauges were deployed at the locations shown in Figure 001. The locations were selected to provide information on the main sources of dust around the quarry and to ascertain whether significant impacts are likely to occur.

3.2 Each combined gauge comprises a “frisbee” deposition gauge with a collecting bottle around which a directional sticky cylinder is fixed. The results from the analysis of dust samples from the combined gauges are reported in terms of deposition rates for undissolved and dissolved solids (mg/m²/day), pH and daily percentage effective area coverage, essentially a measure of soiling, in each of the eight principal directions. The reporting of effective area coverage around the site permits an assessment to be made of the main direction(s) from which the collected dust has arisen. The data are used to determine whether the quarry operations are having an impact on dust deposition rates in the vicinity of the site.
3.3 Sampling commenced in August 2001 and was carried out initially over one three month period. Thereafter, since November 2001, sampling has been carried out at monthly intervals. The samples are collected by TES Bretby, and are analysed at their UKAS-accredited laboratories.

4 Results

4.1 The dust deposition / direction data for the six months since August 2001 are attached as Appendix A, and are summarised in the following table.

<table>
<thead>
<tr>
<th>Stn</th>
<th>Location</th>
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</tr>
<tr>
<td>4</td>
<td>N side of access road</td>
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<td>31</td>
</tr>
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</table>

Table 6.1: Summary test results
note: averages for Stns 1 & 2 are weighted to account for initial three month period

4.2 At Stn 1, the deposition rates for undissolved solids ranged from 8 mg/m$^2$/day, very low, to 59 mg/m$^2$/day, moderate. The effective area coverage rates were also generally low, with a maximum of 0.5% per day from the west during the first monitoring period.

4.3 At Stn 2, the deposition rates for undissolved solids ranged from 7 mg/m$^2$/day, very low, to 121 mg/m$^2$/day, high. The effective area coverage rates were also generally low, with a maximum of 0.5% per day from the northwest and north during the first monitoring period.

4.4 At Stn 3, the deposition rates for undissolved solids ranged from 6 to 12 mg/m$^2$/day, very low. The effective area coverage rates were also low, with a maximum of 0.3% per day from the southwest during the fourth monitoring period.

4.5 At Stn 4, the deposition rates for undissolved solids ranged from 21 mg/m$^2$/day, low, to 50 mg/m$^2$/day, moderate. The effective area coverage rates were also generally low, except for a maximum of 0.6% per day from the south during the fourth monitoring period.
4.6 The deposition rates for dissolved solids ranged from 4 to 45 mg/m$^2$/day at all stations except for 134 mg/m$^2$/day at Stn 4 during the second period. The combined deposition rates for total solids ranged from 13 to 68 mg/m$^2$/day, very low to moderate, for all stations except for high rates of 140 mg/m$^2$/day at Stn 2 during the first period and 184 mg/m$^2$/day at Stn 4 during the second period.

5 Interpretation

5.1 Standards and Controls

5.1.1 There are no UK statutory or recommended dust deposition rates which constitute an acknowledged nuisance. However, it is generally accepted that unacceptable conditions may occur if dust deposition rates exceed 200 mg/m$^2$/day on a sustained basis at a neighbouring property. This equals the deposition rate above which the need for cleaning is said to become excessive and which in the past has been stipulated as a standard by some Mineral Planning Authorities (MPAs).

5.1.2 The onset of nuisance due to soiling is generally considered to occur when the daily effective area coverage exceeds 0.5% at a sensitive property.

5.2 Assessment

5.2.1 The deposition rates for total solids were less than 200 mg/m$^2$/day for all stations during all of the monitoring periods, indicating that nuisance dust emissions have not occurred to date. However, elevated dust levels were recorded at Stn 2 during the first period and Stn 4 during the second period.

5.2.2 The maximum soiling rates at Stns 1, 2 and 4 were 0.5% - 0.6% per day, ie, were at the level for the onset of nuisance if experienced at a sensitive property.

5.2.3 The first period was for three months and it is likely that more elevated dust deposition and soiling occurred at Stn 2 during part of this period. Stn 2 is located on the south side of the access road. The direction data for this period indicate that the principal dust source lay to the northwest and north, ie, was probably the access road during the period of construction of the compound and access road, before surfacing took place.
5.2.4 Stn 2 is located more than 300m north of Fox Covert Hall, over which distance significant adverse impacts due to airborne dust are unlikely to have occurred due to dilution and dispersion.

5.2.5 At Stn 4, the principal contribution to total dust was from dissolved solids, ie, was unlikely to be stone dust from the quarry. The soiling data were very low for the period and the data provide no indication of the principal direction of the source. High pressure, with cold conditions, dominated throughout much of the monitoring period, and it is probable that the source of the dissolved solids was road salt carried in from the public highway.

5.2.6 At Stn 1, the direction data indicate that the source of the maximum deposition rate lay to the northwest and north, ie, was not caused by dust from the quarry. The maximum soiling rate, during the first period, indicates that the source lay to the west, and may have carried from the processing area or access road.

5.2.7 The data from Stn 3 indicate that significant dust emissions have not occurred in this area.

6 Recommendations

6.1 It is apparent that except for elevated dust from the access road during the first period, when construction activities were in progress, dust emissions from the quarry operations are within acceptable limits and are not causing a nuisance at neighbouring properties.

6.2 However, the present locations of the monitoring stations are not optimal for assessing the potential impacts, nor do they cater for Bunkers Hill Farm, which is a specific requirement in the recommendations provided previously. It is recommended that, subject to the local topography and tree cover, the stations be relocated at the start of the next monitoring period as follows:

- Stn 1 should be moved about 100m to the west, to lie between the quarry / processing area and The Oaks.
- Stn 2 should be moved to the southeast corner of Phase 1, about 350m northwest of Bunkers Hill Farm.
- Stn 3 is acceptable.
- Stn 4 should be moved about 300m west to lie between the access road and Home Farm.
6.3 The revised locations are shown in Figure 002.

6.4 In view of the more recent data, it seems likely that any potential impacts on the access road have been overcome. Nevertheless, care should be taken to ensure that track-out is not carried from the site out onto the access road, where on drying it may subsequently be raised as dust.

7 Conclusions

7.1 Overall, dust emissions from the quarry operations do not appear to be causing adverse impacts at neighbouring properties, although elevated dust levels have been recorded on the access road during construction operations.

7.2 The locations of three of the monitoring stations should be altered to provided more useful information on the future potential impacts of the quarry.
APPENDIX 2: Monitoring Results Table
Pitsford Quarry

**Dust Deposition Data**

**Deposition Rate, Undissolved Solids (mg/m²/day)**

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**Deposition Rate, Dissolved Solids (mg/m²/day)**

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Smith Grant LLP

r209/dust-01
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**Wtd Avg** | 6.4 | 3.5 | 2.3 | 0.6 | 6.0 | 4.4 | 10.5 |
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APPENDIX 3: Wind Roses for Bedford
WIND ROSE FOR BEDFORD (RAE)
N.G.R: 5049E 2597N
ALTITUDE: 85 metres a.m.s.l.

87610 OBS.
0.4% CALM
0.1% VARIABLE

SEASON: ANNUAL
Period of data: Jan 1984 - Dec 1993
WIND ROSE FOR BEDFORD (RAE)
N.G.R: 5049E 2597N
ALTITUDE: 85 metres a.m.s.l.

22075 OBS.
0.7% CALM
0.4% VARIABLE

20%
10%
5%
0%

>33
28-33
17-27
11-16
1-10

SEASON: JUN TO AUG
Period of data: Jan 1984 - Dec 1993