Stop Bengeo Quarry (SBQ) Response to the Health Impact Assessment by Ben Cave Associates

Appeal Reference: APP/M1900/W/17/3178839

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INTRODUCTION

This Stop Bengeo Quarry (SBQ) submission addresses the Health Impact Assesment's (HIA) treatment of air and groundwater pollution. The HIA approach to both is fundamentally flawed because there has been insufficient observations at and near the site it is proposed to quarry.

It is it not possible to make a rational assessment of the risk of air pollution in Bengeo without knowing the range of grain-size in the deposits it is proposed to quarry. Specifically, an analysis of the fine-grained matrix of these silica-rich sediments is required to assess the risk to health posed by airborne particulate silica. Samples for that analysis are readily available from adjacent abandoned quarries. No such analysis has been presented in the HIA.

Equally, it is not possible to make a rational assessment of the risk to groundwater without a detailed geological survey of the field it is proposed to quarry. This survey becomes even more crucial because Bengeo Field contains the Wadesmill Road water-supply boreholes. No adequate observations of the geology of Bengeo Field have been presented in the HIA.

The absence of crucial evidence based on observations on site invalidates the conclusions of the HIA on these fundamental issues of pollution of air and groundwater.

Additionally, although the HIA does review the responses from various consultees, it does not reference the Acoustic Associates Noise Assessment commissioned by HCC which reaches significantly different conclusions to those in the applicant's Noise Assessment and might, for instance, have led the authors themselves to different conclusions in table 10.1.

1. AIR QUALITY

Summary

The HIA concludes that *"on the face of the evidence and guidance available, it is unlikely that a project such as this would have significant adverse effects on population health. This is on the basis that all identified mitigation measures are in place, regularly reviewed and adhered to"* (page 1). The decision-making framework used by HIAs is not scientifically or professionally recognised and therefore these conclusions on the health impact from reduced air quality (AQ) represent judgments by Ben Cave Associates (BCA) based on evidence commissioned by the appellants. The limited scope of the literature reviewed, the absence of quantifiable risk data, the omission of specific vulnerable groups, and the reliance on highly questionable AQ models for PM leads us to question the reliability of these judgements.

There are no robust large-scale studies that guarantee the safety of local communities in the UK against the reduced air quality associated with nearby mineral extraction[1]. There is a temptation when faced with uncertainty in situations such as this to retreat to broad extrapolation, models and regulations. However, when a community's health may be at risk, we need robust and directly observed data to guide us to the right decision.

In addition to the proposal now being at odds with government commitments on air quality[2], we believe that the HIA does not rule out the potential for a negative impact on community health for the following reasons:

- There are no data from which to robustly quantify the increase in harmful dust emissions from the proposed site ($PM_{2.5}$, PM_{10} or respirable crystalline silica).
- The latest scientific research shows that even small average annual increases in $PM_{2.5}$ and $PM_{10\text{-}2.5}$ of around 1 µg/m^3 can have statistically significant and clinically meaningful impact on the health of vulnerable groups.
- Recent high-quality scientific research shows that small short-term increases in $PM_{2.5}$ of around 6 µg/ m^3 average over three days also has a statistically significant and clinically meaningful impact on the health of vulnerable groups.
- Recent high-quality scientific research shows that children and the elderly are 3 - 48 times more sensitive to decreases in air quality from various sources compared with adults.

The reasons above and supporting evidence are discussed in more detail in the following sections.

Additionally, the conclusions of the HIA are reliant on the appellant's adherence to planning regulations, monitoring, and BCA's recommendations. In the final section we will question whether this is a realistic expectation given current evidence and recent case studies.

1.1 The proposal to quarry Bengeo field is no longer compatible with the Government's recent commitment to improve air quality

The UK has a very poor record in protecting the population against the health effects of air pollution. For example, a WHO report last year revealed that people in the UK are 64 times more likely to die from the effect of air pollution than people living in Sweden[3]. The current Government has recognised this major public health issue and on 22 May 2018, The Department for Environment, Food and Rural Affairs (Defra) published their Clean Air consultation document with a foreword by the Secretary of State for Environment, Food and Rural Affairs that included the following statements[2]:

> "*Air pollution is the top environmental risk to human health in the UK, and the fourth greatest threat to public health after cancer, heart disease and obesity."*
>
> *"We have already secured a significant reduction in emissions since the 1970s, but now this trajectory has slowed. Now we need to tackle other sources of air pollutants that damage human health and the environment."*
>
> *"Armed with increased awareness and improved scientific measurements, we must tackle these problems with a new goal that takes into account the World Health Organisation's guidelines."*

There is no identifiable level below which air pollution is harmless and regulatory thresholds represent a trade-off between health and practicality. Based on the growing evidence of the profoundly detrimental effects of air pollution, the World Health Organisation (WHO) substantially lowered its threshold for $PM_{2.5}$ for safeguarding population health. In response, some Western countries including the US, Canada, Australia and Scotland have recently lowered their PM objectives to around half the UK AQO. Defra has now indicated that they will follow this trend: *"We will progressively cut public exposure to particulate matter pollution as suggested by the World Health Organisation. We will halve the population living in areas with concentrations of fine particulate matter above WHO guideline levels (10 µg/ m^3) by 2025."*[2]

The HIA submitted by the appellant describes baseline AQ as *"generally good quality"* (8.3.25 page 39). However, it also reports that the baseline levels of PM used to model the air quality impact in the Ware Park area are close to (PM_{10}; 16.12 µg/ m^3) and exceeded ($PM_{2.5}$; 11.3 µg/ m^3) WHO thresholds.

In section 9.2.5 (page 59), the HIA reports the following:

- For annual average PM_{10} concentrations, the UK AQO is 40 µg/ m^3 and the WHO guideline value is 20 µg/ m^3. All the predicted changes in PM_{10} due to the project are below the UK AQO threshold and are also below (although some are approaching) the WHO guideline value.
- For annual average $PM_{2.5}$ concentrations the UK AQO is 25 µg/ m^3 and the WHO guideline value is 10 µg/ m^3. All the predicted changes in $PM_{2.5}$ due to the project are below the UK AQO threshold. However, due to all background levels already being greater than 10 µg/ m^3 the WHO guideline value is exceeded at all modelled locations.

Figure 1 below shows that the Defra estimate for the annual $PM_{2.5}$ concentration is exceeding WHO thresholds for $PM_{2.5}$ at and around the proposed site. We believe that mineral extraction in areas that exceed the WHO guideline of $PM_{2.5}$ is unacceptable when there are alternative rural locations away from urban centres of Hertford and Ware.

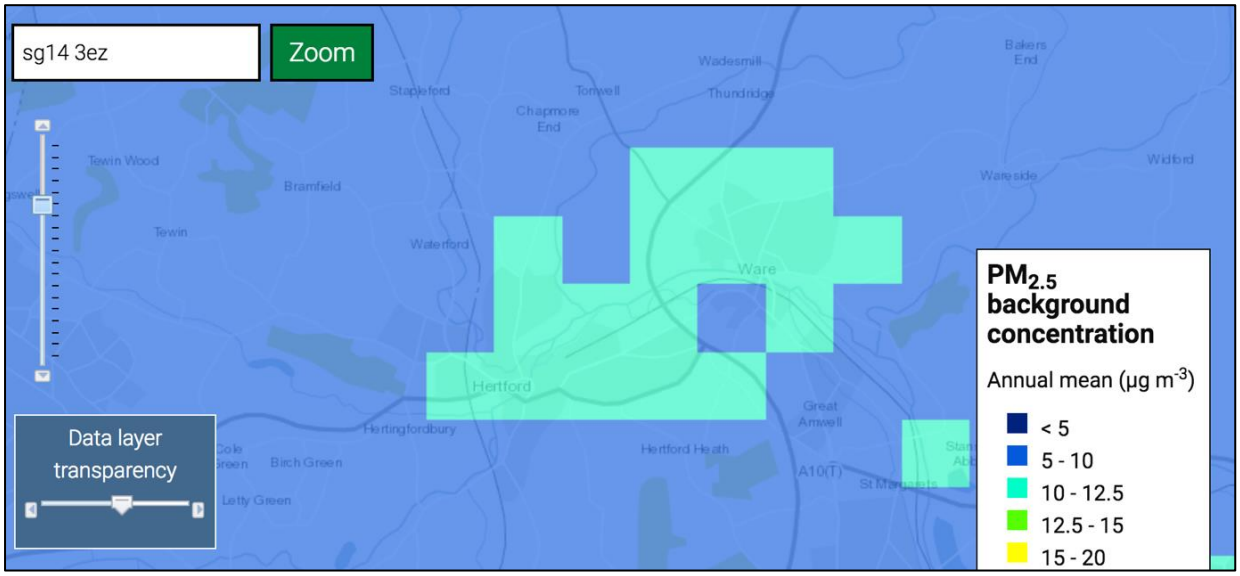
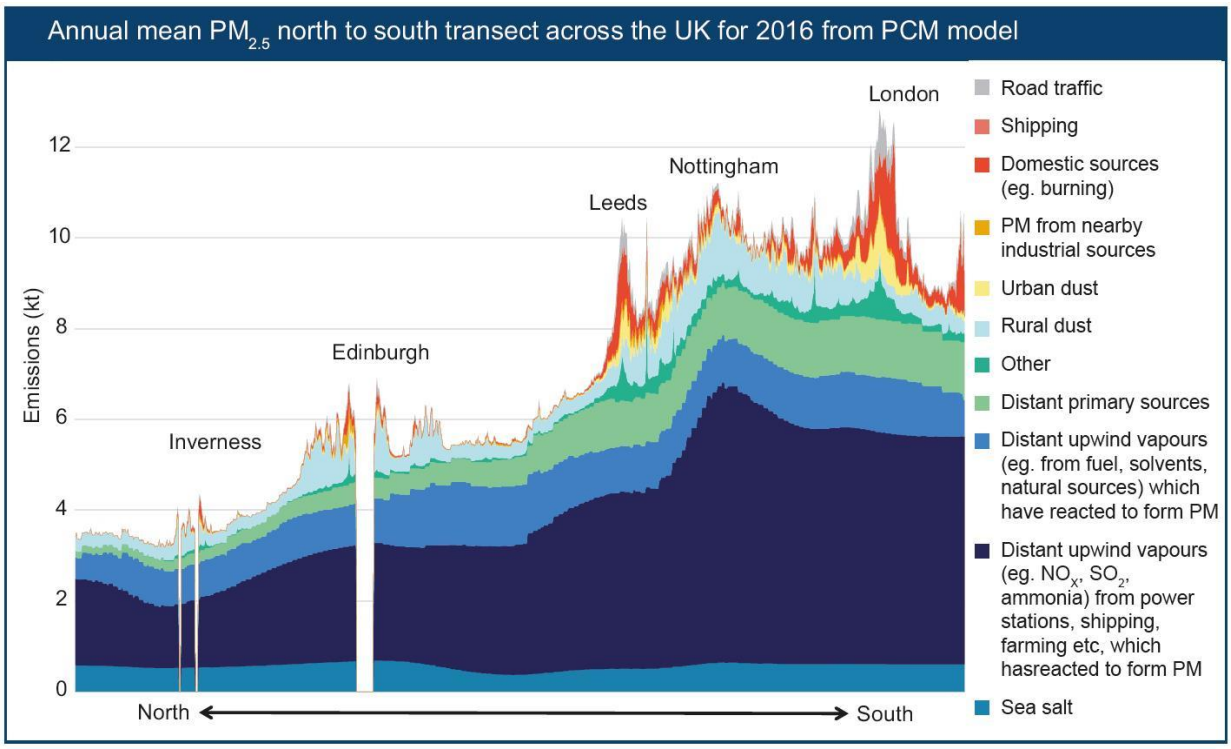


Figure 1: Defra $PM_{2.5}$ annual mean $PM_{2.5}$ concentrations for 2015 in the vicinity of Ware Park



1.2 The HIA fails to acknowledge that quantitative emissions modelling is uncertain and background PM_{10} is very close to levels that could result in exceedances of the AQO according to the Institute of Air Quality Management (IAQM)

The IAQM Mineral Guidance in 2016 states the following: *"Detailed dispersion modelling of dust impacts from minerals sites in the UK is extremely rare and is not generally recommended by the IAQM given the lack of accurate UK emissions data for this sector."*[1]

However, the reliance by the HIA on the appellant's AQA models is clear from page 59 of the HIA, for example: *"At Bengeo Primary School the change [in PM_{10}] is 0.20 µg/m^3. Such changes are unlikely to be associated with significant changes in population health outcomes."*

The expert authors of the HIA should have recognised the flaws in the quantitative models due to the lack of accurate emissions data and not have relied solely on model outputs to conclude there will be no impact on health.

Furthermore, the IAQM guidance states that if the long-term background PM_{10} concentration is less than 17µg/m^3, there is little risk that emissions from a minerals extraction facility would lead to an exceedance of the daily AQO. The difference between the predicted background PM_{10} concentration in the vicinity of the site of 16.12µg/m^3 and the IAQM guidance of 17µg/m^3 is not substantial enough to exclude the possibility that the AQO would not be exceeded.

1.3 There are no robust data on the health impacts of quarrying silica-rich sand and gravel

The HIA cites two papers on the impact of air pollution on health concerning cardiovascular and respiratory disease. These studies relate to PM exposure mainly from vehicle emissions and do not consider the complex mixture of PM that can be generated by quarrying and surface mining. Although there is limited data on the health impacts of most forms of mineral extraction, there is a growing evidence base on the negative impact of surface coal mining. For example, a recent systematic review of the available peer-reviewed literature reported that living near to surface coal mines, in addition to increasing the risk of diseases of the circulatory and respiratory system, also increased the risk of cancer, diseases genitourinary systems, metabolic diseases, diseases of the eye and the skin, perinatal conditions, congenital and chromosomal abnormalities.[4]

There is no discussion in the HIA on potential exposure to respirable crystalline silica (RCS) even though the sand and gravel in Bengeo Field is silica-rich Kesgrave Formation.[5] Silica remains a public health issue and according to The Health and Safety Executives (HSE) trails only asbestos as a cause of occupational cancer deaths.[6] The HSE's American equivalent, the Occupational Safety and Health Administration (OSHA), warns *"If it's silica, it's not just dust"*. Inhaling RCS in tiny quantities over time can lead to silicosis, bronchitis, or cancer, as the dust becomes lodged in the lungs and continuously irritates them, reducing lung capacities. In the human body, crystalline silica particles do not dissolve over clinically relevant periods of time. The local and systemic effects on the human body are permanent and incurable. Any exposure to RCS can cause silicosis although, similarly to asbestos, the adverse effects are not often apparent until many decades years later, which makes quantifying the non-occupational risk almost impossible.

In the UK exposure to RCS is regulated under the Control of Substances Hazardous to Health (COSHH). The HSE advises (guidance sheets QY0 and QY2) *"All RCS is hazardous". "Tell workers: that very fine quarry dust can cause silicosis, which leads to disablement and early death". "Whilst we are able to estimate the exposure to RCS of an individual at work from past data, little is known about the inadvertent exposure of people who are close to but not involved in the work activity".*

Data has since been published (June 2018) that shows RCS levels near to quarry boundaries using proper dust suppression techniques are 150 times higher than background levels in rural locations and exceeding the exposure limits recommended by the US Environmental Protection Agency (3µg/m^3) in 20% of measurements.[7] This exposure limit is derived from epidemiological studies of adult male miners with the application of a three-fold adjustment factor as a margin of safety to account for human variability. Crucially, this benchmark does not consider the risks of exposure to vulnerable populations, which could occur at much lower concentrations. Furthermore, the HSE occupational silica exposure survey was damning and concluded *"in all the four sectors examined actual RCS exposures may be higher than earlier HSE estimates and industry estimates"* and *"Of the 7 quarry sites awarded a rating for adequacy of control measures, one achieved a rating of 4, i.e. achieved a level of control that would be deemed appropriate in accordance with COSHH".*[8] Therefore, the available evidence suggests that most quarry companies are not adequately

protecting their staff against RCS and levels close to quarries operating good dust suppression techniques frequently reach levels that could impact health.

The specific threat to health by particulate silica derived from dry quarrying of the Kesgrave Formation, in which the pebbles are almost entirely composed of silica mainly in the form of flint, is still unknown but the RCS emissions could be higher than the quarries used in the HSE study.[5] Crucially, the composition of the fine-grained matrix between the pebbles at Bengeo Field has not been reported by the appellant. Visible dust is known locally to be a significant nuisance from quarrying the Kesgrave Formation, most recently on the strength of evidence from quarrying at Rickneys, adjacent to the proposed quarry at Bengeo Field. The appellants have presented no quantitative data on the composition and grain size of the Kesgrave Formation underlying Bengeo Field. In the absence of these data it is not possible to predict with any confidence the amount and composition of dust, of any given size of the particle, that will be produced during quarrying in any particular part of the proposed area of extraction.

There is no suitable body of regional data from which extrapolation might be made from the general to the particular to assess the risk of air pollution at Bengeo Field. Only a study of the local deposit in relation to the proposed operations could adequately assess the degree of potential harm from RCS to the citizens of Bengeo.

1.4 The HIA does not report or attempt to quantify the health impacts of small increases in PM on the general population or vulnerable groups

The Institute of Air Quality Management (IAQM) Guidance states that if sites are identified within 1km of a mineral site, then consideration of the effect of potential PM_{10} emissions on human health should be provided. The 2015 consultation document for the new Hertfordshire Minerals Local Plan states that *"sensitive sites can be affected by dust up to 1km from the source"* and is supported by the University of Hertfordshire which states that dust emissions from mineral extraction affect air quality up to 1km away. Also, the Minerals Policy Statement 2, Controlling and Mitigating the environmental effects of Minerals extraction in England, Office of the Deputy Prime Minister, 2005 states that *"PM_{10} may travel 1000m or more and are widely recognised as being associated with effects on human health".* Numerous sites were identified as 'high' sensitivity in the HIA including Bengeo Primary School, which is within 1km for all three phases of the development. In fact, Bengeo school is situated 320m from the boundary of the proposed excavation site.

The presence of a large primary school (presently ~500 children and a cohort of >950 over the timeframe of the quarry) in the vicinity of the proposed site dramatically enriches the sensitivity of the area to any changes in air quality. Children are exposed to a higher burden of pollutants because of their greater ventilatory rate, smaller airways, and propensity to spend more time outdoors, engaged in physical activity. Thus, penetration and deposition of particles in the airways and alveoli in children are likely higher than that in adults exposed to the same concentration. They are also exposed at a vulnerable stage when the immune and metabolic systems are less mature and the lungs are rapidly developing.[9] The prevalence of

asthma is also highest in school-aged children at 16.2% in England.[10] According to a recent UNICEF report on the impact of poor air quality of UK children: *"For babies and young children, these health effects [of $PM_{2.5}$] are even more acute. Exposure to toxic particulates during these critical early stages of development can leave a child with stunted lungs, with respiratory conditions like asthma and reduced brain development."* [9] In the US, the California Environmental Protection Agency published a comprehensive 320-page document on the biomolecular, physiological and metabolic (pharmacokinetic/pharmacodynamic) evidence on the increased susceptibility of children to pollutants.[11] They conclude that an overall 30-fold adjustment factor should be applied to regulatory thresholds for air pollutants that pose a particular risk to children, and in some cases, the factor could be even more substantial.

The HIA acknowledges the elderly members of the local community as a potentially vulnerable group. Pregnant women and developing foetuses are also disproportionality sensitive to air pollution and should have been acknowledged on page 16 in the HIA as a potentially vulnerable group.

Since 2016, when the application to quarry close to an urban site was first submitted, the evidence landscape on the health effects of air pollution has changed dramatically. We can now say with certainty that very small changes in PM exposure in the short and long term has a statistically significant and clinically meaningful effect on health. In the absence of quantified risk data in the HIA, below we present some recent evidence on the quantitative effect of small increases in PM on the general population and vulnerable groups. These studies have all been published in the last three years, many in the highest-ranking respiratory journal, are robust, with statistically significant (at probabilities less than 5%) and clinically meaningful findings. Most findings are derived from large populations where PM levels were similar or lower than the baseline levels of the Bengeo ward reported in the HIA.

- An average increase of just 1 $\mu g/m^3$ predicted $PM_{2.5}$ is associated with the following in school-aged children (5-11 years) [12]:
    - 2.7% increase in the prevalence of diagnosed asthma (95% confidence interval [CI], 1.9-3.6%)
    - 9.2% increase in asthma hospitalizations (95% CI, 6.0-12.6%)
    - 5.1% increase in asthma emergency department visits (95% CI, 2.7-7.6%)
    - Statistically significant and clinically meaningful health effects were also found for the larger fractions (PM_{10}-2.5).
- A 5.92 $\mu g/m^3$ increase in 3-day mean $PM_{2.5}$ is associated with a 7.2% (95% confidence interval, 4.2–10%) increased risk of emergency room visits for asthma in children under nine years old. Whereas increases of 1.9–2.2% was observed for other age strata.[13] Therefore, the younger aged children were 3-4 times more sensitive to relatively small changes in air quality.
- Short-term 10 $\mu g/m^3$ increases in $PM_{2.5}$ air pollution is associated with a 32% (95% CI, 20-44%) increased odds of receiving medical care for acute lower respiratory infection in children aged 3-17. For those aged over 18 the odds are lower but still clinically relevant at 19% (95% confidence interval, 9-31).[14]
- The excess asthma hospitalisations associated with surface coal mining in the US are driven entirely by the young and elderly.[15] Youths (0-18 years) and the elderly

(65+) are around 26 times more sensitive to increases in pollution from surface coal mining versus adults (18–64 years). Elderly men are eight times and elderly women are 48 times more sensitive.

- Children (<5 years) and the elderly (65+) are 3-4 times more susceptible to respiratory hospital admissions following exposure to air pollution from nearby airports relative to the general population.[16] The elderly are 8.3 times more likely to be admitted for cardiovascular problems given the same level of exposure compared with the general population.
- According to the UK Committee on Carcinogenicity, children are estimated to be 4-5 times more susceptible than adults to the delayed effects of asbestos exposure (https://app.croneri.co.uk/feature-articles/are-children-more-vulnerable-asbestos-fibres)

We wish to challenge the assumption that annual PM figures referred to in the HIA can be used to assess health risks for children attending Bengeo Primary School. This approach averages the PM emissions over the entire phase area and calendar year and hides the daily fluctuations in particulate levels. School attendance mirrors the quarry operational hours (8am-6pm, 5 days a week) and therefore children would be exposed to peak particulate levels not an annual average figure. Also, weather conditions have a significant impact on particulate release; in dry weather when children are much more likely to be outside the risk is greater. The potential risk to health from warm weather is acknowledged in the HIA (page 58). This section states that the higher levels of dust in dry conditions is balanced by the fact that winds are lower in the warmer months. In Hertford, the average wind speed in January 2017 was 12.5mph while in June 2017 it was 10mph. Additionally, the air is more turbulent (gusty) in summer and day length is also longer. Without explicit references to research that justifies this assertion, there is no way to tell that this difference is significant enough to offset the drying effects of warmer weather entirely. Having just witnessed the driest start to summer since modern records began in 1961, it is also essential to consider trends in temperature and the increase in hot spells over the coming decade.

In conclusion, we are not convinced based on the latest research that during certain extraction phases and meteorological conditions, there will be no meaningful health impact on the children of Bengeo Primary School and the surrounding area or the large elderly population.

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2. WATER

Summary

The Health Impact Assessment by BCA (HIA) fails to address the specific concerns about groundwater raised by SBQ. The HIA fails to refer to documents crucial to an adequate discussion of the hydrogeology of Bengeo Field. These documents include the authoritative November 2017 hydrogeological report by Professor Frederick Brassington.

The HIA fails to identify the need for geological surveys of Bengeo Field to be presented by the appellants. These surveys are required before a rational decision can be reached on whether safe quarrying is even feasible at a location so close to the Wadesmill Road boreholes.

The HIA fails to take an appropriately long-term view of the consequences for health of loss of supply of water from pollution of the chalk aquifer during or following the proposed quarrying operations.

2.1 Critical analysis by SBQ of key sections of HIA text

This section presents HIA text from Section 9.3 (in italics) followed by SBQ comments on each.

- *"The overall project would have long-term influences, e.g. a changed depth of permeable ground above the underlying chalk aquifer. Ground contamination would be associated with specific pollution incidents (if any) rather than the general nature of the extraction so long-term changes in ground water that could affect health outcomes are not considered*

to be likely." "Restoration of the application site to agricultural use will be undertaken using materials already on site and no additional materials would be imported."

Removal and disturbance of the current protective layer of soil and Kesgrave Formation sands and gravels will permanently increase the vulnerability of the underlying chalk aquifer. This point is made clear in the report by the hydrogeologist Ken Edworthy commissioned in 1992 by Ove Arup for clients McMullen of Hertford. Ben Cave Associates (BCA) make no reference to the Edworthy report, nor to the 2017 report by hydrogeologist Professor Frederick Brassington that was commissioned by SBQ. BCA appears to have failed to take advantage of these reports in preparing the HIA.

- *"Groundwater flow in the chalk is via a fracture network and, therefore, vulnerable to pollution due to potentially rapid transport times."*

BCA fail to describe adequately the dual porosity of the chalk aquifer. Flow of pollutants towards the Wadesmill Road boreholes would be rapid, through fractures and fissures in the chalk. In contrast, pollution of the low-permeability chalk lying between the fractures and fissures would be long-lasting and very difficult to remove. In practice, the boreholes would become a long-term burden on Affinity Water and the community, the end of 80 years of service as a reliable asset. Affinity Water would have to continue pumping the Wadesmill Road boreholes so that pollution did not spread through the aquifer, but the boreholes would no longer be capable of supplying water to the community.
Some six million litres a day of water currently flow from the boreholes, enough to supply Hertford and surrounding areas, Loss of that supply would be a significant matter in an area with an expanding population, where supply of groundwater from the chalk aquifer is already constrained.

- *"Between 1m and 5m of sand and gravel would be retained undisturbed above the chalk. Excavators would be GPS guided to ensure that agreed depths were observed.*"

This method cannot be implemented with any confidence. The problem is that the position of top chalk in Bengeo Field is not determined adequately. The surface of the chalk is most probably rough, as it is both locally and across southern England, not smooth as assumed by the proposed operations. The appellants were asked by the Planning Inspectorate in November 2017 to carry out a ground survey of Bengeo Field. That survey has not taken place. In the absence of that survey, the proposed operating conditions cannot be implemented.

SBQ has consistently drawn attention to this issue concerning roughness of the surface of the chalk, most recently at the inquiry in May 2018. SBQ made formal submissions on top-chalk to Hertfordshire County Council at meetings in County Hall in March 2017 and April 2018. The geological arguments advanced by SBQ have been independently confirmed by the Brassington report and were accepted by the Hafren Water consultant at the inquiry in May 2018.

- *"A detailed hydrogeological assessment (as updated by further information) has been undertaken for the project by Hafren Water.*"

All parties involved in this inquiry agree with the nature of the risks to the chalk aquifer described by Hafren Water. But a geological survey is necessary to establish whether safe quarrying of the Kesgrave Formation is feasible so close to the Wadesmill Road boreholes.

- *"The Environment Agency has been consulted on the application and has specified conditions for the project to be considered acceptable."*

The geological constraints identified by SBQ, and independently confirmed in the Brassington report, have also been accepted by the Environment Agency. Simon Hawkins of the Environment Agency agreed that there was a valid concern with roughness at top chalk, at a meeting convened by Councillor Stevenson and attended by Mark Prisk MP and Dr Bryan Lovell, at County Hall Hertford in November 2017. The Environment Agency has yet to advise Hertfordshire County Council of the Agency's agreement with SBQ on this crucial issue.

- *"In the event of a pollution incident occurring at the quarry, response measures will be in place to prevent infiltration into the aquifer: spill kits would be readily available on site and staff would be suitably trained in their use. The HIA team are informed that the applicant also holds a contract with specialist, quick response clean-up contractors." "Should a significant leak or spillage occur, the Environment Agency and Affinity Water (the public water supply provider) would be informed at the earliest opportunity and appropriate course of action agreed."*

Informing the Environment Agency and Affinity Water of a significant leak or spillage is not the point. By the time any practical steps can be taken, including the use of a spill kits, any significant leak would have found its way through the highly permeable residual Kesgrave Formation into the chalk aquifer.

- *"Releases of oils or fuels would be accidental events but can be considered to be a reasonably foreseeable consequence of storing fuel on-site, undertaking operations and working with plant and vehicles."*

SBQ agrees with this comment by BCA. Indeed, given the geology of Bengeo Field, it is probable that safe quarrying so close to the boreholes is not feasible. Feasibility could in principle be established by an adequate survey of top-chalk, and by mapping the fractures and fissures in the chalk aquifer through which pollution would rapidly reach the Wadesmill Road boreholes. Mapping top chalk can be carried out using established techniques, but mapping the fractures would be a lengthy and uncertain process, using techniques yet to be established with confidence. In these circumstances a precautionary principle should apply, and the Kesgrave Formation in Bengeo Field should remain undisturbed.

- *"The baseline notes the presence of the Groundwater Source Protection Zone 1 for the Wadesmill Road water supply bore hole, which has the potential to amplify water contamination effects (e.g. through drinking water network contamination or disruption)."*

SBQ agrees with this comment by BCA.

- *"The conclusion of the HIA is that any changes in population health outcomes associated with ground or water quality from the project would be not significant."*

This conclusion by BCA can be justified only by taking a particularly short-term view of water-supply. In the short term, Affinity Water would replace supply from the Wadesmill Road boreholes from elsewhere in the network. SBQ takes a broader and longer-term view of the health of the population of the area than that presented in the HIA. Permanent loss of supply from the boreholes, and irreversible contamination of the aquifer, would represent a risk to the supply of water that is so central to the health of the population.

3. PHYSICAL ACTIVITY

Summary

This section summarises the views of SBQ on the physical activity element of the HIA. It attempts to address and challenge the points raised by Ben Cave Associates' (BCA) document as they relate to the use of the local community of Bengeo Field for taking physical exercise and draws on real-world examples of how the field is currently used.

3.1 The research on which this document is based

Over the course of the last two years the Stop Bengeo Quarry group has collected up-to-date evidence of the way people actually use and enjoy the Bengeo Field. We have undertaken two surveys on our website, one which questioned respondents' feelings about the landscape (417 respondents), and one about its use as an amenity (270 respondents.) We also undertook a monitoring exercise of the use of the field, on a cold, wet, December morning.

3.1.1 Monitoring exercise: On Sunday 3 December 2017a small group of SBQ members took it in turns to stand in the middle of Byway 1 (under the Lonely Oak Tree, to give some shelter from occasional rain) and to count the number of people who crossed the Bengeo Field between 10am and 3pm. It was a typical, cold December morning. During that time, 55 people did so, on foot, on their bikes, with their dogs, their partners and on their own. When questioned, many of them said that this was a regular walk for them, and one which they loved because of the peacefulness and the openness of the views.

3.1.2 Landscape survey: There were 417 responses on this on-line survey. 10 percent of people who responded had travelled for 15 minutes or more to walk on the Bengeo Field. Among the different groups of people doing so were:

- Mountain bikers
- Running groups
- Livery stables
- Canicross (running with your dog)
- Long-distance walkers
- Mums and Dads groups, and so on…

3.1.3 Amenity survey: This online survey, conducted in the spring of 2017, attracted responses from 270 users of the Bengeo Field and provided information on how much the area is regarded as a local amenity to the Hertford community.

3.2 What the research shows

The findings of this research, together with the hundreds of letters and emails received by the County Planning Office and Planning Inspectorate, and the more than 30 testimonies given at the Public Inquiry by local residents, challenge the Health Impact Assessment (HIA) in a number of ways:

- They combine to undermine the appellant's HIA conclusion that *"changes in population health outcomes associated with disruption of, or reduced environment quality (noise, dust, air quality and views) along public rights of way near the application site… would be not significant."* On the contrary, we have collected

convincing evidence to show that both the physical and the mental health of significant numbers of children, older people, and people with existing poor health (the population groups referred to in Section 9.4 of the HIA) would be undermined by quarrying this beautiful, quiet, safe and accessible piece of land so near to the community of Bengeo.

- The opinion, also put forward in the HIA, that there will be medium and long-term benefits to the community in accessing the field as a result of the construction of new permissive and permanent footpaths, is also rejected. New footpaths will not be appreciated or used if the landscape is so altered by quarrying that it is not worth accessing.

The amenity survey also highlighted residents' feelings about the Bengeo Field, which were often passionate:

- *"It is a restorative workout for mind, body and soul. It is priceless."*
- *"I just love this Field and couldn't live without it. Love to walk there in the peace and quiet of such lovely views."*
- *"It is a very beautiful part of Bengeo. I am a visitor from Cornwall, it's my favourite place in Bengeo."*
- *"It is so pleasing visually – it lifts the spirit."*
- *"I take my toddler there. He loves running around the Field, looking at all the birds and other wildlife."*

3.3 Use of Bengeo Field – case studies

The research has also highlighted specific groups who will be disadvantaged by the proposed quarry. These case studies are set out below.

3.3.1 People with existing poor health

Increasing physical activity, as the appellant's HIA states, is a public health priority aimed at reducing obesity, type two diabetes, stroke, cancer and heart and lung disease. 2018 is, indeed, Hertfordshire County Council's "Year of Physical Activity" aimed at making people of all ages more active and, therefore healthier.

Guided Health Walks are part of this campaign. Hertfordshire has a developed programme of these walks, which are led by trained volunteers and are publicised in doctors' surgeries, libraries and community centres. Many GPs advise patients who are overweight, have high blood pressure or raised blood sugar levels, or are suffering from depression or loneliness, to take part in one of these regular walks. Typically, they happen weekly, they involve 3-5 miles of brisk walking, take place in pleasant, rural surroundings and attract 10-20 walkers. They start and end near a pub or café, so that walkers can relax afterwards with a drink or snack, can talk and make friends.

The leader of the Bengeo Health Walk, Veronica Fraser, said that the walk which includes Bengeo Field is particularly popular. Since it takes place on a Tuesday morning, it attracts older people, who are retired. Two of the current walkers are attempting to stave off type 2 diabetes, through exercise and diet. She said that people who did not previously know the Bengeo Field (and some come from outside the immediate area) are surprised by how lovely and peaceful it is. When asked if she would continue to use the field when planning her walks, if quarrying were to start there, she replied: *"Who wants to walk along the edge of a working quarry?"*

When she heard that new permissive paths were promised, she felt that the noise of earth moving machinery, the dust generated and the crossing of the main Byway Hert1 by lorries (suggested in the more recent scheme) would make it a most unsuitable site, together with the spoiling of the view, across the field to the east and over to Ware Park.

3.3.2 Local children

SBQ's two surveys show that many families with children walk, cycle and run across Bengeo Field to St John's Wood and Chapmore End, often taking the family dog with them.

Another important user of the field is the Scout Organisation in Bengeo (Beavers, Cubs and Scouts) because it is easily accessible, rich in flora and fauna and - crucially - safe.

Beaver Scouts are young boys and girls (6-8 years old), who are organised into "colonies" of up to 24 children and who work towards badges for skills and activities. In the summer, they frequently spend sessions out of doors, exploring nature, learning crafts, following trails, learning how to work co-operatively, in groups.

The leaders of Bengeo Beaver colonies explained how important risk assessment is, when they are planning Beaver activities. Leaders have to be sure that these very young children will be in a challenging, but safe, environment. Keeping them away from busy roads and traffic, in a place where the air is clean and where leaders can see them, at a glance, is crucial. They said that Bengeo Field is perfect for their summer outside meetings and that they use the field 2-3 times a summer.

When asked if they would continue to do so, if quarrying was allowed, one leader replied that it would be unlikely because of Health and Safety implications:
"If they start putting up bunds to mask the workings, will be still be able to see the children? If there is machinery around, that machinery poses a danger to young, inquisitive children. If the paths are no longer being maintained by County, and they become overgrown, that is also a danger…I also feel that it is unlikely that parents will want them to go nearer to the quarry, which will be the source of dust and noise."

She also said, *"Taking out the field would make it very difficult for leaders to find a suitable open-air space."*

3.3.3 Middle-aged residents

A key priority of both Government and County is to improve the mental and physical health of residents in all age groups, particularly those whose work commitments mean that they have restricted time for leisure and physical exercise.

Bengeo Bicycle Club - This is a social club of approximately 25 members. Although the ages of its members range from 25 to 60, the majority are in their 50s. They cycle, as a group, across Bengeo Field towards Chapmore End and Tonwell. As one of its members, Rob Chandler, said *"It's a beautiful view and is a relaxing place to meet up. It's off-road and therefore safe from traffic. The latest Hertfordshire traffic report stated that there was a higher rate of serious injuries and fatalities in the 50+ group and that is most of us."*

"We would certainly not ride the main road (B158) as quarry lorries and bicycles are not a good mix…A quarry in Bengeo Field would be a travesty…it would stop most of the rides through to Chapmore End and beyond for us."

3.4 Commentary: challenging the Health Impact Assessment's view on the value of proposed new footpaths through and around the quarry site

Ben Cave Associates' HIA argues that physical activity across Bengeo Field will continue during the different phases of the quarry's activity and will be enhanced by the construction of permissive paths, and further enhanced when the quarry workings are complete by the presence of permanent new paths. This judgement is questionable. As their HIA states in paragraph 9.4.5: *"The development would give rise to impacts to the users of Restrictive Byway Hert1 through a visual change to the agricultural operations, and well as to the potential for noise and dust. The local topography is such that it will not be possible to fully screen views…"*

It seems very unlikely that walkers, cyclists and runners will wish to continue to exercise on the field when the environment which they value for beauty and serenity has changed – the very presence of a convenient footpath does not mean that it will be used, if using it does not give pleasure.

As the writer of the HIA says: *"there is the potential for long-term benefit if these routes are open and well maintained".* Experience of the after-effects of gravel working in Bengeo has shown that this long-term maintenance rarely happens.

4. FOOTPATHS

Summary

We strongly challenge the assumptions made from a desk-based study with no prior knowledge of how the community uses the footpaths in and around the Bengeo Field.

4.1 Timescales and effects on physical activity (HIA section 9.4.4)

The HIA discusses some of the short and medium-term effects of quarrying on the community. We feel this section is very misleading as the culmination of the different effects of the quarry over a potential 7-10 year period for the 3/0770/16 scheme would have an overall long term negative effect on the community and the amount of physical activity they would participate in. Even the 3/2352/17 scheme would last for at least 5-7 years without taking into account the time needed for restoration, which the HIA fails to discuss or offer any idea of a time scale for this:

- For example, the creation of bunds is mentioned as a short-term effect, but once created, they would be present throughout the life time of the quarry operation and throughout restoration to screen the community from dust and noise and so their presence would actually create a long term effect. They would screen a variety of views on all footpaths, in particular Footpath 4, which has the beautiful view of the whole field when looking east.
- The diversion of Restricted Byway Hert1 and Footpath Hert1 during the 3/0770/16 scheme is described as a medium-term effect as this would be in place for approximately 2-3 years. It also discusses the 'phased nature of the project', which again we feel is very misleading. Although the quarry activities will be carried out in phases, at any one time somewhere on the field, there will be effects from dust, noise and bunds when using Restricted Byway and Public Footpath Hert1, so walking on this route even before the footpath diversion would make it far less

appealing to use and create a long term negative effect on health and physical activity.

- It fails to mention that the same long term negative effects would also apply to the 3/2352/17 scheme even though the Restricted Byway and Footpath Hert1 is not diverted. Therefore, anyone using the route would be in close proximity to constant quarrying activities at any point during the 5-7 year scheme duration as well as having to cross the site access road in order to walk the complete route into St John's Wood and onwards to Chapmore End. Again, as with scheme 3/0770/16 it would become far less appealing to use and create a long term negative effect on health and physical activity.

4.2 Mitigation or enhancement measures (HIA section 9.4.7)

In this section of the HIA it discusses a number of particular footpaths or routes that would either be created or enhanced as a way to mitigate the negative effect the quarry would have on the community of Bengeo. We disagree with the statements made in this section as follows:

- The creation of a new permissive path along the eastern edge of the Bengeo Field, just a few metres from the edge of Wadesmill Road (B158), would not be a potential health benefit or improve physical activity as it is completely unappealing. Feedback from local residents shows it would not be used due to the proximity to a very busy commuter road, which would be dangerous and also lack any special countryside views to those walking along it as well as being very noisy. Unlike Public Footpath and Restricted Byway Hert1, which are well used as we have proved, tranquil and very safe to walk along with beautiful views both east and west.
- The creation of a new permissive path linking Public Footpath Hert13 with Restricted Byway Hert1 It is already possible to gain access to Restricted Byway Hert1 from the East of Wadesmill Road, which the public regularly uses, so again this offers no benefits.
- It is proposed that a third permissive path is created along the western edge of the field, linking Public Footpath Hert24 (adjacent to The Orchard) with Public Footpath Hert4 adjacent to properties on Sacombe Road. Again, there is already an unofficial footpath here that is well used by the public that offers excellent views exactly where this third permissive path is suggested. So, what the applicant is suggesting offers no actual benefit and in fact there would be a negative impact on physical activity as people already using this route would be deterred from doing so by any quarry activities and subsequently by tree planting and landform changes which would destroy all the open views.

4.3 Effects on health and physical activity (HIA sections 9.4.12 – 9.4.15)

The HIA concludes that there would be no real negative effect on the amount of physical activity undertaken by the local community and states the following:

- "*As alternative physical activity opportunities, including other public rights of way and the play park / green gym to the south west of the site are available, any effect is likely to be modest and unlikely to be widespread. The magnitude score of medium is therefore reflective of the public health opportunity from an improved public rights of way network. It is not expected that there would be a substantial reduction in physical activity opportunity due to the project." (9.4.12)*

We strongly disagree, as although there are other public rights of way routes in the area these are not nearly as easily accessible to the local community as Bengeo Field and do not

offer the same stunning views and tranquility. The play park referred to is the one adjacent to the Buckwells Field development and would be extremely close to the sites activities if approved. As a result, there would be less use of the play area by local children due to parents concerns with noise and dust. That would also apply to the green gym mentioned which is in the same location.

- The opinion, also put forward in the HIA, that there will be medium and long-term benefits to the community in accessing the field as a result of the construction of new permissive and permanent footpaths, is also rejected.

- *"The phased nature of the project, as well as the mitigation measures that reduce the impacts of project related disturbance and emissions (see sections 9.1 on noise and 9.2 on air quality), means it can reasonably be expected that the affected public rights of way network (as expanded by the project) would continue to be used."(9.4.12)*

We reject this claim and also note there is no evidence from the applicant to show that footpaths would still be used as much as they are today. New footpaths will not be appreciated or used if the landscape is so altered by quarrying that it is not worth accessing. As our evidence shows, certain community groups have already expressed their huge concerns with using the field if quarrying were approved.

- *"The conclusion of the HIA is that any changes in population health outcomes associated with disruption of, or reduced environmental quality (noise, dust, air quality and views) along, public rights of way near the application site due to the project would be not significant. The general population effect is likely to be negligible and the effect to particularly vulnerable groups is likely to be minor adverse (not significant)."* (9.4.14)

On the contrary, we have collected convincing evidence to show that both the physical and the mental health of significant numbers of children, older people, and people with existing poor health (the population groups referred to in Section 9.4 of the HIA) would be undermined by quarrying this beautiful, quiet, safe and accessible piece of land so near to the community of Bengeo and Hertford.

- We would like to add that the new proposed bridleway offered to mitigate the negative impact of the quarry if approved, is not appropriate compensation for destroying a much loved and used local amenity.

- *"However, the opportunity for the project to create new circular public bridleway (or restricted byway) routes suitable for a range of ages, modes of active travel and levels of mobility (as outlined in section 11), has the potential to improve population health outcomes. Such a long-term benefit (if adopted by the project) would be significant.*" (9.4.15)

Although suggested to be a benefit it would come at a huge cost to the local community. It is also not guaranteed to happen and only a gesture from the applicant. Based on their lack of engagement with the community there is no evidence to show this would actually happen once quarrying ceased. As the writer of the HIA says: *"there is the potential for long-term benefit if these routes are open and well maintained".* Experience of the after-effects of gravel working in Bengeo has shown that this long-term maintenance rarely happens.

If you asked anyone in Bengeo if they would prefer to keep the field and footpaths as they are today, or endure years of dust, noise and destruction to be left with a hole in the ground and a possible new path, the answer would be the former.

5. ROAD SAFETY

Summary

We believe neither the appellant nor their advisors have the necessary qualifications, expertise or local knowledge to sufficiently provide assurance on this important issue (HIA sections 8.2.30-8.2.33). Extra pollution and the very significant road traffic dangers arising from the movement of HGVs has not been considered in the HIA.

The author of the HIA seems to have been unaware of targets for road safety and casualty reduction. These have been ruled out at the national level by the DfT but the Mayor for London has nailed his colours to the mast and published challenging targets for the capital. At the local level Hertfordshire County Council published its targets in its Road Safety Strategy in 2011. The County Council has just published its new Local Transport Plan running from now until 2031 - Policies 16 and 17 and Performance Indicator 6 which monitors the number of “Killed and Seriously Injured” in road collisions every year all indicate a clear aim of reducing casualties.

The author of the HIA seems similarly unaware of the legislation around road safety and casualty reduction. To section 5.1 in the HIA should be added reference to the Road Safety Act 2006. There is also a section on ‘safety precautions’ in the Traffic Management Act 2004.

We welcome the ‘scoping in’ of Road Hazards (page 23, table 7.2 and paragraph 7.3.9), however, the table refers to the introduction of the junction but does not address the concerns of SBQ caused principally by the queueing of gravel lorries waiting to collect loads at the start of the working day when the B158 is at its busiest in the southbound direction. This is brushed over in the one-and-a-bit lines of paragraph 8.5.26. We are not reassured by the wording in the line ‘Transport including parking’ (page 25) in the table.

There is no analysis of the collision data associated with gravel lorries and recognition or analysis of the interaction of lorries queueing to enter the site and morning rush hour traffic. According to DfT data there are around 600 collisions a year resulting in injury involving a Heavy Goods Vehicle (HGV). The highest profile incidents are those in our cities, particularly London, involving HGVs and cyclists. Many of the lorries involved are of the 8-wheeler tipper type that is likely to be collecting gravel from the proposed Ware Park site. We are concerned about the lack of analysis of the significant threat posed by this type of vehicle, particularly if they are likely to be arriving at the site in number at the start of the day and then trying to cross the southbound lane to turn right into the gravel pit. It is the queue waiting on the verge or earlier turnings that we fear, and the slow acceleration from a standstill across the busier southbound lane into the central right turn lane. At least they would be facing traffic heading north and therefore get better eye-to-eye contact with oncoming drivers but they would then, of course, present their whole length side-on as they enter the site. None of this feels like a safe manoeuvre to be encouraging.

Table 7-1 quite rightly refers to the reduction in road safety on the B158 Wadesmill Road in the vicinity of the site access junction but only applies that risk to children, young people and older people. Surely it applies to all those using that road, mainly by car?

Because of the foregoing, we welcome the recommendation in paragraph 11.2.16 that **no** traffic would enter or leave the site during school opening and closing times. We look forward to seeing this formally incorporated into the proposal.

6. COMMUNITY AND THE ENVIRONMENT

Summary

We are aware that one of the primary aims of a Health Impact Assessment is to ensure that any potential positive changes to general health are identified and weighed against the obvious negatives. It seems to us, however, that this can result in such *potential* health benefits being given undue prominence and, presumably, weight - particularly when they are few in number.

The HIA highlights some potential benefits:

- Two new looped rights of way in Bengeo Field (11.2.10)
- Unspecified improvements to the Sacombe Road children's play area (11.2.11)
- "Citizen power and influence" as discussed in Table 7.2 (page 19*): "The project has contributed to local community participation in democratic activities. Consultation on the application has likely contributed to community empowerment and self-efficacy, with potentially beneficial effects on population health."*

6.1 Benefits to health and well-being

The Rights of Way are discussed in this document in the chapter on Physical Activity and Footpaths. In this section we restrict our comments to pointing out that:

- This is an HIA proposal and not part of the application being appealed.
- It is at best debatable whether the suggested paths are actually a significant benefit.
- The scale of any positive benefit seems (to the layman) to have been given undue weight by the HIA, given that the field is already actively used and enjoyed in its current state.

There is no detail supplied as to what the HIA recommends for the Sacombe Road children's play area. The area is relatively new and already has several pieces of equipment. While extra provision would be welcomed, it is hard to see what changes might be made that would lead to a health benefit significant enough to outweigh the negative aspects of the proposed development.

The HIA notes in table 7.2 that there is a potential well-being benefit accruing from the community's efforts to prevent the development from going ahead. It also acknowledges (9.5.17) that this effect is likely to be reversed should the permission to quarry eventually be granted: "*community pride and value placed on community influence for those who have madea sustained contribution to consultation on the project (with the direction of effect dependant on the application determination)."*

It seems, therefore, that the HIA is saying that there is potential for a positive effect on well-being unless the proposed development goes ahead. At best, this reads as muddled thinking - why introduce the topic as a potential benefit if that benefit is dependent on the quarry not being permitted?

Speaking as members of the community under discussion the SBQ group would contend that "Citizen power and influence" (table 7.2) could only contribute to some kind of net well-being benefit if the planning process reached a final result and refused the application quickly. It is hard to see how it could outweigh the stress and uncertainty resulting from the extended, legalistic process that is now underway (i.e. this appeal and whatever may come later).

6.2 Negative health and well-being impacts

Section 9.5.18 (and others) highlight the issue of trust as a determinant in the public health outcomes for the community. This is a complex topic and can be broken down into (at least) four areas:

- Trust in the planning process
- Trust in the applicants
- Trust in general terms that if permission is granted a quarrying project is likely to proceed as described in the original application.
- Trust in the overseeing authority (i.e. Hertfordshire County Council) to discharge its responsibilities.

6.2.1 The planning process

There have been aspects of the process that make it harder for the public to understand and participate in what is happening. For example:

- Public consultations often seem to occur during major school holidays when families are likely to be away or when they may be distracted by increased childcare.
- The second quarrying application (the 1.25m tonne scheme) and the appeal against the refusal of the first (the 1.75m tonne scheme) were made in parallel making it harder for the public to distinguish between them and respond adequately.
- After its refusal, the 1.25m tonne scheme was added to the appeal as a potential alternative for the Secretary of State to consider, but could still (we understand) be the subject of a further appeal. It is hard for anyone other than a planning specialist to understand the justification for or implications of conflating the two applications in this way.

The above examples illustrate the fact that a layman may find much of what has happened during the overall application process to be arcane and even apparently unfair. This inevitably undermines trust in the process.

6.2.2 The applicant

The applicants have totally failed to engage with the community. A poorly advertised public exhibition was held in 2015, but there has been no attempt at dialogue since then. Instead, the applicants have made repeated attempts to use the planning system to override the very obvious concerns of the local community and Hertfordshire County Council's planning decisions.

Given the level of hostility to the proposals it is hard to imagine that the public could have a significant level of trust for the applicants - but we believe that their behaviour to date has made that much more unlikely.

6.2.3 Quarry operation

The area around Bengeo contains two other quarries - Rickneys and Waterford Heath - which have highly unsatisfactory histories and which have been left in an idle, unrestored state for many years. Clearly, the public cannot know whether or not the current applicant will honour the commitments in their proposals and indeed they might prove to be more reliable than other local operators. Given the dire history, however, it seems unlikely that a

significant level of public trust can be achieved before trustworthiness has been demonstrated.

6.2.4 Oversight

The experience of the restoration delays at Rickneys and Waterford Heath undercuts any faith that the public may have in the ability of HCC to police quarry operators effectively. This is not a question of how any specific problem has been handled, but simply an observation that the oversight system appears to be broken. It might even be the case that there are good explanations/excuses for the way in which those earlier quarries have unfolded, but from a public perspective the end result is still the same - idle sites sitting as eyesores for many years.

We have discussed various aspects of trust in this context at some length in order to make the point that the local community is highly unlikely to believe that the proposed quarrying project will unfold as predicted nor to trust the applicants/operators. Section 9.5.18 of the HIA states: "*For these factors the effect on population health has the potential to be significant. As noted in paragraph 9.5.3 above these include effects on physical health (e.g. headaches or blood pressure) and mental health conditions (e.g. anxiety or depression). Should consent be granted, the future quality of dialogue with the community, clarity of information provided on the project and level of trust established between the community and both the applicant and regulators will be important factors influencing the degree of any health effect."*

We therefore contend that the **significant** health impacts discussed in section 9.5.18 of the HIA are indeed likely should the quarry go ahead.

7. Landscape and visual impact

Summary

When examining the relationship between the proposed quarry and the health of local people, it is vital to try to understand the current amenity value of the field, its landscape and character and why people use it. This can only be discovered by seeking and surveying local opinion. The Health Impact Assessment by Ben Cave Associates makes many assumptions on landscape and visual impact, but does not back these up with empirical evidence.

7.1 Stop Bengeo Quarry surveys

Stop Bengeo Quarry group have carried out two surveys of users of the field the first of these looking at landscape had 417 respondents and the second one looking at amenity had 265 respondents. Additionally, we carried out a monitoring exercise and have run a Facebook Group, for over two years, to which contributors have regularly added their shots of views across the fields and added comments on landscape. We have also spoken to organisers of walking groups and many local residents (case studies referenced earlier in the Physical Activity section of this document). We believe that this base work has given us a sound overview of why the field is used and what is special about it. Furthermore, this work has given us an empirical base to challenge some of the assumptions made by the Ben Cave assessment.

The land in question is the closest open agricultural land to the Molewood Estate, it has stunning views and it widely used by residents. It is the only open land that can be easily accessed from the estate without crossing a main road.

Stop Bengeo Quarry attests that it is both the views across the field and the agricultural nature of the land that make it a special and valuable resource for local residents, as well as being a great educational resource for both our local school and children.

In both of our surveys residents particularly note the open agricultural nature of the land and the views as a reason for using the paths in the field. As one resident put it: *"Any gravel extraction "will be destroying valuable benefits, that form a keystone of our community. Neither the farmland nor the benefits could ever be "restored".*

94% of respondents to our surveys saw the views across the field as "very special" or "special".

The Ben Cave assessment does in fact acknowledge this when it says: *"9.5.14 The value placed on the current agricultural setting by the community is understood to be high (based on community consultation responses).*
…
For these wellbeing influences that relate to the local community's relationship with their environment, effects are likely to be relatively widespread (though decreasing with greater distance from the application site). For some people daily visual and auditory cues … could sustain an adverse influence on well-being."

Our own studies back this up as 73% of respondents to our amenity survey said that having a quarry would stop them using the field. For many local walkers and runners there are in fact no viable alternatives to using the field for their walks or runs without crossing busy main roads or travelling a significant distance.

Given the HIA's own acknowledgement of the importance of the land to the community it is therefore surprising that on 5.1.16 the study concludes that *"changes in population health outcome… is likely to be negligible."*

We argue that a significant number of runners or walkers would stop using the field due to the presence of the quarry (based on our research) and that this would lead to a decrease in the overall number of healthy activities undertaken. This would clearly have a greater than negligible effect on the health of field users. Therefore, the conclusion reached by the HIA, that any health impact would be negligible is unsustainable. The study is not based on an empirical study on the use of the field or follow up work on any likely change, any conclusions drawn are therefore un-evidenced.

It also seems contradictory with Ben Cave's own point:
"9.5.17 However, the following factors may influence local health outcomes to a greater extent:
..
• community judgments and beliefs around anticipated change in the landscape (e.g. a desire for the landscape to be unchanged, even if actual visibility of any change would be limited)."

Our own work indicates that many people in the "older people" category that Ben Cave states is "most vulnerable" would be affected by the change in landscape and loss of amenity. The Molewood Estate has a large number of older residents and many of these people do engage in health walks across Bengeo Field.

7.2 Field restoration and benefits

Both Ben Cave and the apellant have made a point of headlining benefits to residents due to the proposed introduction of new pathways and planting of hedgerows. Stop Bengeo Quarry do not accept that planting vegetation or providing of new pathways offsets the damage caused by a quarry.

Furthermore, we have serious questions about how long the proposed restoration would take and the length of time needed before the field became a peaceful and useable resource. Our own experience with local quarry restorations (such as Waterford Heath) leads us to believe that at least 15-20 years would be needed to allow the land to regain some of its former amenity value. Many of our older residents will clearly not be around by then and this is something that Ben Cave also admits when he says *"for some older people effects should be considered permanent."* (Table 7-2 page 20)

It is also noted in table 10-2 that the potential significant adverse effect more likely for older people than for younger people.

The conclusions made by the study that the amenity and landscape value will be enhanced appear to originate from the idea that new walking routes together with the planting of trees and hedges will in themselves improve the landscape and amenity value of the field:
"9.4.15 Such a long-term benefit (if adopted by the project) would be ***significant****. Benefits would be expected to start during the working period of the project and increase as the new routes increasingly benefited from the restored application site landscape."*

We note that at least two of these routes (along the edge of Sacombe Road and along the farm track from the Wadesmill Road) have been in use by residents since the 1960s and are thereby the subject of current Rights of Way applications, so we submit that these routes are not actually new.

The assumption the landscape will be improved by the restoration seems to be based on the proposed planting of hedges and trees rather than landform. The loss of landform as a result of the quarry is undisputable and permanent. We further maintain that the current landform is what gives the field much of its character and attractiveness.

We therefore attest that the supposed enhancements suggested by the applicant do not constitute either restoration of the landscape or are of any immediate benefit to residents. Any longer-term benefits would depend on significant ongoing management over a sustained period of the proposed hedges, paths and trees. Even if the restoration was carried out exactly as stated we do not believe that this would be sufficient to offset the damage to the landform.

Furthermore, the study is confusing and contradictory on the point of landscape, for example at one point the study says *"effects are likely to be relatively widespread"* but then goes on to conclude that "*effects will be negligible"*.

We believe that the development of any quarry on this site will have a significant negative impact on the local community including a significant psychological impact. We also believe that landscape changes will deter people from using the field for health walks and for sporting activities.

Love of the openness of the Bengeo Field and its landscape is a key reason why people use this field for sports activities and health walks. If people use the field less as a result of changes to the landscape or the presence of the quarry it will obviously have a detrimental effect on the health of residents.