

Appeal by RJD Limited and Gowling WLG Trust Corporation Limited

Site at Land at Ware Park, Wadesmill Road Hertford

Appeal Reference: APP/M1900/W/17/1378839

CLOSING SUBMISSIONS on behalf of Stop Bengeo Quarry

1. INTRODUCTION

1.1 Stop Bengeo Quarry (“**SBQ**”), opposes this appeal by RJD Limited and Gowling WLG Trust Corporation Limited (the “**Appellants**”) on two grounds:

1.1.1. The issue of water pollution, specifically the contamination risk posed by the proposed development to the Chalk aquifer which underlies the site. This groundwater source supplies the Wadesmill Road pumping station owned and operated by Affinity Water (the “**Wadesmill Rd PWS**”) ¹. It is agreed by the Appellants that, without mitigation, both the original (1.75mt) and amended (1.25mt) schemes pose an unacceptably high risk of pollution to this vital groundwater source [CL/1, ¶1.8]. The measures proposed by the Appellants to mitigate this risk are inadequate to protect the Chalk aquifer.

1.1.2. The issue of air-quality related health impacts, specifically the treatment of the health impact identified in the Health Impact Assessment produced by Ben Cave Associates (the “**HIA**”) for vulnerable groups within the community as a result of exposure to short-term peak concentrations of particulate matter. The HIA has not demonstrated that this health impact would be acceptable in the context of the policy framework.

2. WATER POLLUTION

The policy framework

2.2 This appeal must be determined in accordance with the development plan, in particular the Minerals Local Plan Review 2002 – 2016, adopted March 2007 (the “**Minerals Local Plan**” or “**MLP**”) [CD/20], unless material considerations indicate otherwise.

2.3 The guiding principles of the National Planning Policy Framework 2018 (the “**NPPF**”), together with the national planning practice guidance document on minerals (the “**minerals NPPG**”), should be referred to as a material consideration.

2.4 The MLP requires that: “*Proposals for mineral extraction and related development... shall not be permitted if the development...would have a negative quantitative and/or*

¹ The Wadesmill Rd PWS, which is only 100m from the site and supplies, supplies c.60% of the total water supplied by pumping stations in the Hertford area.

qualitative impacts on the water environment, including...groundwater resources, unless appropriate measures can be imposed to mitigate any harmful effects". [MLP, policy 17(iv)] (emphasis added). The burden is on the Appellants to prove that they have put forward such measures.

- 2.5 The NPPF requires that there should be no unacceptable adverse impacts on the natural environment from the proposed development [NPPF, ¶205(b)]. Planning decisions should ensure that the proposed development is appropriate for its location taking into account the likely effects of pollution on health and the natural environment, as well as the potential sensitivity of the site to impacts that could arise from the development. [NPPF, ¶180]

- 2.6 Regard should also be had to the Minerals Local Plan Consultation draft (December 2017) (the "**Draft Minerals Local Plan**" or the "**Draft MLP**") [CD/22]. While the Draft MLP is not yet part of the development plan, it can be given weight as a material consideration.
 - 2.6.1 The Draft MLP emphasises that a balance must be achieved between the need for minerals extraction and the potential impacts that extraction could have on the local community and environment. [Draft MLP, ¶13.56].
 - 2.6.2 Such development must not cause any unacceptable adverse impact on local water bodies, noting that, as roughly 70% of Hertfordshire is covered by Source Protection Zones, which provide much of the county's drinking water, this is of particular local importance. [Draft MLP, ¶13.10]
 - 2.6.3 The site at Ware Park has been removed from the Preferred Area category in the Draft MLP.

The evidence

2.7 The Appellants' position is set out in the evidence of Mr Christopher Leake and the two Hafren Water ("Hafren") reports.² The key points can be summarised as follows:

2.7.1 The development proposed in both the original and amended scheme poses two risks to groundwater quality in the Chalk aquifer and consequently to the public water supply:

2.7.2 A risk to groundwater quality from increased turbidity if fine materials are mobilised in the workings and transported into the Chalk aquifer. [Hafren 2014 report, ¶5.3.2(a)] (the "**turbidity risk**") ('medium' with a significance of impact of 'major'); and,

2.7.3 A risk of contamination of the sand and gravel, and therefore the chalk aquifer, as a result of accidental spillage of oil and fuel [i.e. hydrocarbons] [Hafren 2014 report, ¶5.3.2(b)] (the "**hydrocarbon risk**") ('high' with a significance of impact of 'major').

2.7.4 Following the relocation of the wheelwash, offices and weighbridge in the amended scheme, the Hafren 2017 report identified "*additional risks from hydrocarbons washed off vehicles in the wheelwash and foul drainage from the offices and mess facilities*". [Hafren 2017 report, ¶4.3.2]

2.7.5 To mitigate the turbidity risk, a layer of minerals would be left in the base of the excavation at varying levels of between 5m – 1m across the site, the depth increasing with the proximity to the Wadesmill Rd PWS [Hafren 2014 report, ¶6.1.2(a)]. Hafren concludes that this reduces the turbidity risk to 'negligible';

² Hydrogeological Impact Assessment in support of gravel extraction at Ware Park, Hertford, Hertfordshire, dated July 2014 (the "**Hafren 2014 report**"); and, Addendum to Hydrogeological Impact Assessment Ware Park, Hertford. Dated July 2017 (the "**Hafren 2017 report**") (together the "**Hafren reports**") [CD/15(2a)].

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- 2.7.6 To address the hydrocarbon risk, in addition to the protective residual layer, a variety of measures would be adopted regulating the storage, movement and use of fuel around the site and imposing training requirements and protocols to deal with any spillage. [Ibid.];
- 2.7.7 To address the increased hydrocarbon risk and the additional risk from foul drainage, the Hafren 2017 report proposes that all water generated by the wheelwash would be securely disposed of with no use of a soakaway. be recycled with no drainage to a soakaway. [Hafren 2017, ¶¶5.1.2(b) and (c)].
- 2.7.8 The Hafren 2017 report concluded that “*with these mitigation measures in place, residual impact to the Chalk aquifer is considered to be ‘negligible’*”. [Ibid.]

2.8 SBQ’s position was set out in the evidence of Professor Brassington. The key points can be summarised as follows:

- 2.8.1 It is agreed that the categories of risks identified in the Hafren reports are accurate. However, it is not agreed that the measures proposed by Hafren mitigate those risks to the extent that planning permission can be granted.
- 2.8.2 It is agreed that the residual layer scheme and the mitigation measures for the management of potential pollutants are designed to work together to address the risk posed by pollution to the site.
- 2.8.3 Regarding the protective layer of residual materials, even if a 5m layer of sand and gravel were sufficient to act as a filter in a range up to 300m from the boreholes supplying the Wadesmill Road PWS (which SBQ does not accept for the reasons set out below), there is no evidence to support the contention that a lesser layer would be adequate to perform the same function at greater distances. The methodology on which the reduced thicknesses by distance

were established, not in evidence before the Inquiry, nor was this information made available to Mr Leake or his colleagues when producing the Hafren reports.³ During cross-examination, Mr Leake agreed with Professor Brassington that a purely distance based approach (which in the absence of any evidence to the contrary appears to have been used here) is not appropriate when assessing the sensitivity of the different parts of the site to the risk of pollution. Flow rates within the chalk aquifer must also be taken into consideration, which rates depend on the presence and extent of water-bearing fractures and karstic features in the aquifer.

- 2.8.4 The location of the majority of the site within Zone 1 of the Environment Agency Source Protection Zone for the Wadesmill Road PWS means that contaminated groundwater could arrive at the supply boreholes in no more than 50 days. The presence of fractures and karst features such as swallow holes in the Chalk aquifer could mean that any contaminant generated by the site could travel to the supply boreholes even faster, in as little as one or two days.
- 2.8.5 Mr Leake agreed with Professor Brassington that these features could exist across the whole of the proposed site as there was no evidence to the contrary, meaning that there could be little or no difference in site wide flow rates. On this basis, if Hafren's assumption regarding the 5m layer being sufficient to protect the most sensitive area of the site is correct (which is not accepted), the same thickness of overlay should be left across the entire site. This mitigation measure has been included in SBQ's proposed water management conditions. If it is decided that the further investigation of the Chalk (as specified below) is not to be undertaken, this condition must be imposed to guarantee the highest level of protection possible in the absence of the further information which SBQ considers necessary to fully evaluate the sensitivity of and mitigation at the site.

³ During cross-examination, Mr Symes asserted that this proposed mitigation was based on a previous planning application. There is no evidence before the Inquiry to support this assertion and Mr Symes was unable to provide any further specifics as to the methodology used to devise this system of proposed mitigation.

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- 2.8.6 As stated above, Hafren's assumption that the residual thickness mitigation measure would be sufficient is based on inadequate data concerning the Chalk aquifer including: the contours of the Chalk rockhead on which the gravel layer would rest and from which its thickness would be measured; and, the location and nature of the fractures and karstic features within the Chalk itself, the presence of which, as stated above, can increase the rate at which groundwater and any potential contaminant would flow through the Chalk.
- 2.8.7 Hafren's drawings of the contours of the Chalk rockhead appear to have been created using a smoothing programme to determine the rockhead elevations between specific data points. This methodology is inappropriate for generating contours of a Chalk rockhead which, due to the way in which the geology of the site was formed, is unlikely to be smooth. This smoothing programme will be used to generate a guide 3D GPS model for excavation of the site.
- 2.8.8 Mr Leake conceded, based on the evidence of Mr Wardrop [CL/1, ¶¶6.39 & appendix 3, pg. 2], that peaks do occur from time to time in the Chalk and can be anywhere from 1 – 2m high. There is no evidence to show that such peaks do not occur over the site of the proposed development. The uneven nature of the Chalk rockhead as a whole is evidenced by photographs taken in the 1990s during the quarrying at Rickneys, which site immediately abuts Bengeo Field⁴. These photographs show that the Chalk rockhead had been exposed, dug and the resulting material spread over the site to dispose of it. Professor Brassington concludes that this occurred because the Chalk rockhead was uneven and the Chalk that had been dug was at an unexpectedly high elevation. In his evidence in chief, Mr Leake did not disagree that this was the most likely explanation. The Chalk rockhead at the Ware Park site is similarly highly likely to be uneven, rather than smooth.

⁴ The provenance of these photos is evidenced in correspondence between SBQ and Herts CC [ID54].

2.8.9 If Hafren proposed to apply the residual layer mitigation measure on the basis of their flawed Chalk rockhead contours, it is likely that there would be significant irregularities (i.e. up to a few metres high) in the depth of the layer of gravel, negating its alleged protective qualities.

2.8.10 The impact of any irregularities in the Chalk on the proposed residual layer mitigation measure is illustrated in the Isopachyte maps prepared by the Appellants. In cross-examination, Mr Leake conceded that there were areas in each map where the proposed residual thickness was below the layers required in the proposed system of mitigation agreed with Affinity Water. In the case of the amended scheme⁵, the thickness within the 3.0m contour line that starts at grid reference 5/3 could be anything from 3-2m, in an area of the site where the Appellants should be leaving at least a 3m protection layer. In the case of the original scheme⁶, the thickness within the 5.0m contour line running through grid reference 3/4 could be anything from 5-4m, in an area of the site where the Appellants should be leaving at least a 5m protection layer. By way of an example, if there is a peak of up to 2m in the Chalk at either of these points, the protective layers would be reduced still further. In the case of the amended scheme where the minimum thickness could be anything up to 2m, the protective layer could be rendered non-existent. This fundamentally undermines the effectiveness of the proposed mitigation measure and would have the effect of reducing the protective layer to levels well below those agreed between the Appellants and Affinity Water, whose lack of objection was conditional on these minimum layers being in place [CD/5, pg. 23, ¶7.16].

2.8.11 Mr Leake fails to evaluate the issue of turbidity risk and mitigation in the context of the original scheme, claiming that the issue of pinnacles will automatically be addressed by virtue of the residual layers being thicker (from 3m to 6m nearest the Wadesmill Rd PWS) under the amended scheme. In any event, even under

⁵ Plan No. 1217/1.25/UM/1

⁶ Plan No. 1217/1.75/UM/1

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the amended scheme, a pinnacle of 2m would have the effect of reducing the proposed 6m cover in the area nearest the Wadesmill Rd PWS to 4m, less than the 5m protective layer proposed in that area under the original scheme.

2.8.12 In the absence of a proper study of the surface of the Chalk, it cannot be said by the Appellants that the residual layer mitigation measure will be effective to protect the aquifer from potential contamination as a result of the proposed development.

2.8.13 Mr Leake expressed the view that encountering unidentified peaks in the Chalk would not be associated with a higher pollution risk, on the basis that exposed chalk would have to be fissured for the pollutant to reach the groundwater. However, Mr Leake conceded that measures should still be taken (i.e. covering with a protective layer) to cover unfissured chalk – presumably including areas where peaks have been encountered – on the basis that there is still a risk of contamination even if any exposed chalk was unfissured. Mr Leake invited the Secretary of State (the “**SoS**”) to place weight on the fact that a site operator would not want to expose the Chalk because this would risk contaminating the aggregates extracted. In light of the evidence from Rickneys, where the Chalk appears to have been exposed regardless of the impact on the quarry output, and given the uncertainty about the layer of residual material that will actually be left in the base of the excavation (for the reasons set out above), it is reasonably foreseeable that without further information as to the chalk rockhead, accidental and potentially adverse exposure of the Chalk will occur if the site is worked.

2.8.14 Mr Leake conceded that there is also currently a lack of information as to the presence and location of the fissures and karst features across the site. He did not disagree with the conclusions of the Edworthy report (appended to Professor Brassington’s supplementary proof) which identified enhanced karstic features present on the site associated with extremely rapid flow rates and thereby accepted that karst features are possibly present across the site. A

stated above, information as to the location of these features across the site is essential to a proper assessment of its sensitivity and whether the protective layers proposed by the Appellants are indeed appropriate to mitigate the potential adverse impact on the Chalk aquifer.

2.8.15 SBQ has suggested methods which would provide the best available evidence as to the nature of the Chalk rockhead and has included a survey using these methods as the starting point for its proposed water management conditions. An appropriate geophysical survey such as this could provide more detailed information concerning the contours and features of the Chalk rockhead. Professor Brassington considers that it would be technically difficult to detect and identify the fractures and karstic features within the Chalk itself with the accuracy he would consider sufficient to assess the adequacy or otherwise of the proposed mitigation measures. Due to this difficulty, he recommends a precautionary principle should be applied and permission for the development refused. In any event, no permission should be granted on the basis of the inadequate data on which Hafren currently relies as the basis for its mitigation strategy.

2.8.16 In relation to the further mitigation measures proposed to address the hydrocarbon and foul drainage risks, due to the high probability of fractures and karstic features being present across the site, the measures proposed are not sufficient to reduce the level of this pollution risk from 'high' to 'negligible' as stated by Hafren. In the event of contamination occurring as a result of a spillage or other incident, there is a significant possibility that the Chalk aquifer would have to be abandoned as a water source in the long term due to the contaminant retentive nature of the Chalk. This would represent a significant cost to local infrastructure. The potential for contaminated water to be distributed to homes across the Hertford area if rapid and appropriate action were not taken cannot be disregarded.

2.8.17 While Mr Symes is reluctant to concede that there were circumstances in which a significant amount of pollutants could be released at the site as a result of the quarrying activity if mitigation were in place, the Appellants' HIA concludes, and SBQ would agree, that accidental spills can be considered to be a reasonably foreseeable consequence of quarrying activity [9.3.11, pg. 64], which proposition holds true even with mitigation in place. Even on a best-case scenario, the risk of spills therefore cannot be ruled out, especially in the context of a development where we have on site on a daily basis the potential for at least 60 major spills (60 spills of 205l as defined as major spill by Appellants).

2.8.18 The HIA considers that the likely health effects of any groundwater pollution would arise from the disruption to local water supply [9.3.15]. Mr Cave did not have access to information as to Affinity Water's supply network and conceded that he could not comment on whether a replacement water source would be available. There is no evidence before the Inquiry as to whether, in the event that the chalk aquifer were to be contaminated, Affinity Water would be able to source an output equivalent to that of the Wadesmill PWS (which produces 60% of the local supply)⁷. In the absence of this evidence, the possibility that contamination of the aquifer would cause significant disruption to the community, as well as being a blow to local infrastructure in an area where houses and population numbers are only increasing⁸, cannot be ruled out by the Appellants.

2.8.19 In the course of the Inquiry, it became clear that various sources of and pathways for hydrocarbon and other pollution risks had not been considered in

⁷ Mr Symes invited the SoS to assume that Affinity Water would be able to locate such a source. In the absence of any supporting evidence before the Inquiry, such an assumption would be entirely inappropriate.

⁸ The MLP notes that the water supply in Hertfordshire is under pressure due to the increasing population, with groundwater resources across the region at or approaching full utilisation. The need to protect these resources is repeatedly emphasised. [MLP, ¶¶3.1.1 – 3.1.2; A4.21-22, 24].

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the Hafren reports. These include the use of a soakaway to an oil interceptor in the load out area in both schemes. This feature is a notable omission as it involves the trapping and temporary storage of oil underground at the site, with the risk for leaks going unnoticed. In particular, in the amended scheme, the area into which the soakaway would be sunk correlates with the area where the protective layer is at its thinnest (as described above), meaning that the only direct discharge to groundwater from the site will occur where the protection provided by the residual layers is at its most minimal.

2.8.20 Other features that have not been addressed in the Hafren reports are: the use of chemicals in the intensive weed control programmes proposed as part of the phased restoration of the site by Ms Deakin; boreholes as a potential pathway for pollutants; and, the fact that an oil tanker will have to access the site on a frequent basis to refill the site's storage tanker bringing another 5000l or so of potential contaminant on to the site. When questioned about these omissions in the Hafren Reports, Mr Symes made comments to the effect that if they had been included in the risk assessment they might not have been deemed significant. It is not for Mr Symes, as a non-expert, to come to conclusions on the assessment of pollution sources and/or pathways. These risks should have been included in the Hafren Reports for expert assessment. As it is, the Inquiry does not have the benefit of the Appellants' expert's assessment of these risks or a recommendation of how they should be mitigated.

2.8.21 Further, both Mr Leake and Mr Sutton stated under cross-examination that new pollution risks will arise and/or change as the operation of the site progresses, meaning it will not be possible to exhaustively assess the risks associated with working the site. First, the Hafren Reports do not include risks which were already or should already have been known about from current site operations plan (e.g. oil tanker to re-fill storage tank and the presence of a soakaway) and which should therefore have been assessed. Second, if it is not possible to assess all development pollution risks at the initial stage, it is prudent to include in conditions (as SBQ have done) a provision regarding hydrogeological impact

assessment to be carried out after each phase of the development would be necessary to make sure that any new risks arising are assessed and mitigated as soon as possible.

2.8.22 Professor Brassington also raised concerns about the efficacy of the mitigation measures proposed to deal with spills on the site. For example, the involvement of Adler and Allen to address major spills. Given the high sensitivity of the site and the presence of contaminant bearing fissures and karst features, Adler and Allen's guaranteed response time of 4 hours is entirely inadequate, as is the average drive time from Adler's nearest base (19 minutes from approximately 13 miles away). A major spill would necessitate an immediate response. Further, under the Appellants' standard procedures [JS/1, appendix 4] this company would only be involved to address major spills. In the context of this site any spill, no matter how minor, would have the potential to pollute the Chalk aquifer.

2.8.23 While the measures proposed by the Appellants may be best industry practice in the context of generic minerals extraction operations, the particular sensitivity of this site to pollution and the consequences of any contamination renders them inadequate in the instant case. For example, with regard to the procedures that would be put in place to deal with potential spillages – on which at least 7,294l of potential contaminants (excluding the 5,000l of fuel stored on hardstanding) would be present each day⁹ – the standard leaks and spills mitigation measures described in the evidence of James Sutton (“**JS/1**”) [JS/1, appendix 4] would be wholly inappropriate in the context of this site.

2.8.24 For example, Professor Brassington stated that the spill kits mentioned at various points in the mitigation measures would be useless as they would not prevent spilled contaminant from filtering down into the aquifer and the groundwater. Mr Leake did not disagree with Professor Brassington, only

⁹ CL/1, pg. 17, table 4

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stating that spills might be of some benefit on the hardstanding. Various other of the mitigation measures, for example building a bund of sand around a medium spill or digging a hole in the ground to prevent further spread of a major spill would also be pointless, if not perilous, in mitigating the impacts of a potential spill at Ware Park because they similarly would not stop the downward and lateral underground spread of contaminants into the groundwater and then the Wadesmill PWS boreholes. Mr Leake acknowledged the limitations of the mitigation scheme put forward by the Appellants, but positively endorsed Professor Brassington's proposed mitigation measure of immediately excavating the affected sand and gravel and removing it to a containment area from whence it can be securely removed.

2.8.25 Various documents and protocols relied on by Mr Leak in his proof as being site-specific measures are also missing, such as the emergency response plan [CL/1, 6.28 & 6.31]. While it has been assumed by SBQ, and apparently by Mr Leake that the spills response protocol in Mr Sutton's appendix 4 listed the mitigation measures that would be in place at Ware Park, on cross-examination, Mr Sutton stated that these were generic measures and were not intended to be indicative of the measures to be imposed at the site. Although this appears inconsistent with Mr Leake's evidence, as he relied on their adequacy in his evidence, if Mr Sutton is correct, then an appropriate spills response protocol is also missing from the Appellants' application. In fact, following on from Mr Sutton's evidence, it was very difficult to establish exactly what mitigation proposals should be relied on as representative of the approach which the Appellants are claiming to be adequate for a site the sensitivity of which is agreed to be high.

2.8.26 The absence of such crucial details – constituting significant elements of mitigation and accompanied by frequent comments that these details will only be worked out later after consent has been granted – will make it difficult if not impossible for the SoS to come to an informed view as to the appropriateness of the mitigation measures proposed, especially where experts and consultees

have stated that very specific measures should be implemented. If an expert's view or a consultee's non-intervention is premised on these very specific measures, the SoS also needs to be sure that they (i) are capable of rendering the development acceptable and (ii) that they have been properly included in enforceable planning conditions.

2.8.27 The Appellants' witnesses on the issue of water pollution emphasised the fact that the relevant consultees – the Environment Agency (the “EA”) and Affinity Water - have not objected to the application. First, it must be remembered that the consultees have not objected on the basis (as stated above) that specific conditions will be in place to mitigate the impacts of which they were aware from the Hafren Reports and/or their discussions with the Appellants. Second, and more importantly, the consultees' verdicts as to the suitability or otherwise of the development in planning terms is not determinative. The final decision on the issue of policy 17(iv) compliance is for the SoS. While weight should be given to these responses, the SoS will form a judgment on the basis of all the evidence presented at the Inquiry which includes evidence not seen or heard by the relevant consultees, including the views of SBQ's expert and the responses of the Appellants' witnesses during cross-examination, for example setting out the further pollution risks not identified in the Hafren reports. The EA has also recognised its own limitations regarding its ability to assess the sensitivity of the site in correspondence with Dr Lovell, who shares Professor Brassington's concerns about the mitigation measures proposed by the Appellants [CD13, doc 4 and 5]. As stated above, the SoS will not have the benefit of the full reasoning behind the mitigation as agreed between Affinity Water and the Appellants (as stated above).

2.8.28 On multiple occasions, the Appellants' witnesses have sought to downplay the sensitivity of this particular site to pollution by alluding to other mineral extraction programmes taking place at sites underlain by the Chalk aquifer. First, despite inviting the SoS to place weight on this, no evidence has been provided to the Inquiry as to the hydrogeological and/or pollution risks which

may have been assessed for these sites and there is therefore no basis for the SoS to make any comparison between Ware Park and any of the sites mentioned. Second, the SoS's decision on policy 17(iv) compliance has to be on the basis of the specific site, the specifics of the operational programme proposed for the development and the unique facts pertinent to both.

2.8.29 In light of the above, the pollution risk posed by the proposed development is such that, given the nature and importance of the Chalk aquifer, a precautionary approach should be taken and planning permission should be refused.

2.8.30 At the very least, planning permission should not be granted without highly prescriptive mitigation measures being put in place, for example a requirement that following any spillage of potential contaminants the affected sand, gravel or other materials should be excavated, stored in a safe location and then removed from site as soon as possible. This is likely to be the only effective method of dealing with such a leakage. Mr Leake expressly endorsed and adopted this proposed condition in his evidence to the Inquiry and agreed that a highly prescriptive approach to conditions would be suitable in this case, in light of the site's sensitivity and the fact that the permission to be granted would not be a personal one. In these circumstances, as stated above, it is important for the SoS to be able to review and comment on appropriateness of mitigation measures and possible conditions and, unfortunately, it is SBQ's view that this cannot be done on the basis of the evidence before the Inquiry.

2.9 Mr Leake stated in his proof that, in accordance with the then NPPF, ¶122 "*it must be assumed that the proposed mitigation measures, endorsed by the Environment Agency, will be effective*". Mr Leake has now conceded that this statement represents a misinterpretation of the NPPF. Those within the planning regime should only adopt the assumption described in NPPF, ¶122 where the polluting process in question will be subject to a separate authorisation, licensing or permitting decision under a separate regulatory regime [*Gladman Developments Ltd v Secretary of State for*

Communities and Local Government [2017] EWHC 2768 (Admin), ¶39]. Mr Leake specifically stated what was asked by myself and the Inspector in his evidence that there were no permitting and/or licensing regimes active on site meaning that all mitigation has to be dealt with and enforceable within the planning system.

- 2.10 In summary, it has become evident in the course of the Inquiry not only that the mitigation measures proposed by the Appellants are insufficient to mitigate the categories of risks that have been identified thus far by Hafren, but that there are additional risks that have not been assessed or discussed in the context of mitigation by the relevant expert. On this basis, there is even more scope for doubting the adequacy of the mitigation measures proposed to render the proposed development compliant with MLP, policy 17(iv).

3. AIR QUALITY RELATED HEALTH IMPACTS

The policy framework

- 3.1 The relevant policies were set out in full at ¶¶4.6 – 4.13 of the proof of evidence of Roger Barrowcliffe. The key themes can be summarised as follows:
- 3.1.1 The MLP is silent on the issue of health impacts although it does state that the quality of the environment plays a key role in both maintaining and enhancing quality of life [MLP, 2.2.2].
- 3.1.2 The NPPF requires that minerals extraction should not have any unacceptable adverse impacts on human health (NPPF, ¶205(b)). Planning decisions should sustain and contribute to compliance with pollution limit values and objectives but should also identify opportunities to improve air quality where possible or at the very least mitigate the impacts on air quality. (NPPF, ¶¶ 170(e), 181).

3.1.3 The draft MLP requires that proposals for mineral extraction will not be permitted where the development would result in unacceptable adverse impacts on human health (Draft MLP, Policy 14).

The evidence

3.2 The HIA recognises that health effects are observed in the wider population when it is exposed to higher concentrations of particulate matter (“PM”), including PM₁₀ and PM_{2.5}. It acknowledges that there is no lower threshold concentration of particulate matter which is fully protective of human health. The HIA’s evidence in relation to health impacts in the wider population is not in dispute.

3.3 The disagreement between the Appellants and SBQ arises as to the HIA’s treatment of the extent to which air quality impacts arising from the proposed quarry operations would be responsible for health effects on people in the local community, in particular on especially vulnerable groups within the site-specific population. The HIA concludes [at 9.2.20, pg.62] that there will be an adverse impact on vulnerable groups when exposed to short-term peak concentrations of PM. However, the HIA categorises this adverse impact as ‘minor’ and assesses it as ‘not significant’. It is Mr Barrowcliffe’s opinion, and SBQ’s position (for the reasons set out below), that the HIA, in its treatment of this risk, has been unable to unequivocally demonstrate that there will be no unacceptable adverse health impacts on the vulnerable members of the site-specific community.

3.4 There are various points Mr Barrowcliffe makes as to the HIA’s methodology and its reliance on the Redmore Air Quality assessment, and by extension to the evidence of Professor Sokhi who reviewed this evidence, which undermine the reliability of the HIA’s treatment of this specific health risk.

3.4.1 It is agreed that there is no level of exposure to particulate matter at which health effects in the population are not observed. This has long been recognised by international (WHO) and national organisations (COMEAP and

DEFRA) is supported by all the available evidence. This means that health effects can occur even when a project is in compliance with relevant air quality limit values for pollutants. This feeds in to the relevant IAQM 2017 guidance [CD35.2] (¶7.11) which comments that the assessment of health impacts is a matter for an HIA and not an air quality assessment. Whilst it is accepted that the likelihood of health impacts reduces in line with exposure to particulate matter, it is not sufficient to rely on compliance with air quality limit values alone, something which the HIA and Professor Sokhi heavily emphasised, as evidence that there will be no adverse health impact. The fact that a site is compliant with air quality limit values is not determinative of the issue of health impacts.

- 3.4.2 Professor Sokhi commented in his evidence to the Inquiry that no changes in air quality limit values are currently in contemplation. However, he acknowledged that the government's aspiration, as expressed in the draft Clean Air Strategy is to reduce concentrations of PM over the next decade. Mr Barrowcliffe has stated (which was not challenged in cross-examination) that in trying to achieve this reduction in PM concentrations, small but significant gains in air quality are hard won. The point to be taken from this, in line with the NPPF which refers to the planning decision contributing to the improvement of air quality where possible, is that to achieve the aim of reducing PM concentrations – which are harmful to human health at any level – we will need to stop treating small contributions as insignificant. This is especially the case in areas like Hertford where the PM_{2.5} baseline is already at or above WHO guideline of 10 mg/m³.
- 3.4.3 While the HIA does acknowledge the existence of an especially vulnerable sub-set of the site-specific population, it does not attempt to quantify that population or give consideration as to its baseline health. As framed by Mr Barrowcliffe in his evidence, in doing so the HIA 'does not tell the whole story' of this particular health impact. Mr Barrowcliffe has stated in his evidence that the exposed population could run to hundreds or thousands of individuals,

including children would fall into the especially vulnerable category. The 496 children currently attending Bengo School is an important sub-set of this vulnerable category. As observed by Mr Barrowcliffe, the total 'population' of the primary school over the lifetime of site will be much greater than this.

- 3.4.4 Professor Sokhi repeatedly endorsed the HIA approach on the basis that you cannot talk with any certainty about health impacts on anything smaller than a large-scale population. First, if this is correct, the fact that you cannot with certainty assess health impacts for a small population indicates that any attribution of 'minor' or 'significant' to such health impacts must also be uncertain. Given the lack of any definition in the HIA of 'minor' in the context of a scale of categories of assessment, meaning that the line between 'minor adverse' and 'adverse' is entirely unclear, this uncertainty becomes very important as it suggests caution should be taken when making pronouncements as to the acceptability or otherwise of health impacts on small groups. Second, as was put to Professor Sokhi in cross-examination, there is statistical information available based on which it is possible to quantify the baseline health of even a small population and from there talk about the likely health impacts on that population of increases in PM exposure. For example, the asthma prevalence in the local population is 5.9%. Applying that percentage to the 'population' of Bengo school we get a number of asthma sufferers just under thirty. In reality, we know that there are currently 46 children at the school with the diagnosis, which is closer to 10%. There is therefore a basis on which you can quantify health problems and therefore impacts on a small-scale population, despite Professor Sokhi's statement that such an exercise would never produce a significant number.
- 3.4.5 Professor Sokhi also stated in evidence that an HIA could not go to the individual level because there were too many variables involved in assessing impacts on complex health conditions. He did not go so far as to state that where there is information about individual health conditions that would be affected by heightened PM exposure, these should play no part in the SoS's

considerations. The Inquiry has heard and the SoS will read accounts of children's illnesses first-hand from parents who are confronted by the possibility that their children's health conditions may be exacerbated. We all saw their distress and fear for their children's future safety which the HIA has done nothing to allay. Mr Barrowcliffe's proof includes individual examples of current residents of the local area but the broader point is that during the life of the site there may be others who will be part of the site-specific population, either by attending the primary school or living in the area, who have these or other conditions. Neither the HIA nor Professor Sokhi have ruled out health consequences for individuals with these conditions. Professor Sokhi in fact has stated that you could not comment on health impacts at this level with any confidence. Given that the SoS has to decide whether there are any unacceptable health impacts, in the knowledge of these vulnerable individuals who may be representative of others, in addition to known and quantifiable vulnerable groups such as asthma sufferers, SBQ would invite the SoS to find that if health impacts mentioned in the HIA cannot be ruled out, that this an unacceptable adverse impact and should preclude permission being granted. While the HIA may state that it would be disproportionate to look at individuals, how can evidence of these individuals be disregarded once it has been made available?

- 3.4.6 While diagnosing a range of vulnerable groups within the community, the HIA fails to consider the fact that there will be significant cross-over between those groups, meaning that there will be multiple individuals with multiple vulnerabilities. For example, a child at Bengoe school with asthma, who lives in Buckwell Fields (nearby residential development) and walks along the public rights of way in the immediate vicinity of the quarry. That is a more extreme example of multiple vulnerability, but this Inquiry has heard evidence from multiple residents of Bengoe who themselves and whose children would be vulnerable to air quality related impacts on a number of levels. When asked to comment on this in cross-examination, Professor Sokhi did not rule out the issue of multiple vulnerability as a consideration.

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- 3.4.7 In summary, the assessment of health impacts for the local community, Professor S... says that you cannot predict health impacts with any confidence for a site-specific population. This is entirely consistent with Mr Barrowcliffe's observation that although none of the estimates of health effects of exposure derived from epidemiological studies show that the quarry would cause large numbers of adults and children to suffer adverse health outcomes, neither do they show that they would not occur for those vulnerable groups identified in the HIA.
- 3.4.8 Moving on to the modelling underlying the Appellants' case on health impacts, the HIA does not consider the possibility that any uncertainty attaches to the results of the Redmore AQA but accepts them uncritically. Mr Barrowcliffe, with the benefit of his experience in air quality assessment as well as health impact assessment has made a number of points which SBQ says throw doubt on the results of the modelling carried out by Redmore and therefore on the conclusions drawn from them by the HIA.
- 3.4.9 Firstly, Redmore's modification of the emission factor used within the ADMS model to give an area-based emission rate based on the whole operational area of each phase, rather than smaller percentage of that area reflective of actual hourly quarry activities (such as 1ha or 100m²), has the effect of 'double-diluting' the pollutant emitted by the quarry. In other words, by spreading the PM generated by the site over an unrealistically wide surface area of the quarry, the emission is diluted at source before being diluted further as part of the modelling of the dispersion effects. Mr Barrowcliffe states that this inappropriate modification could lead to an underestimation in the figures modelled by Redmore of at least a factor of 10. Whilst this underestimation might not be of significance when looking at the annual average concentration, it could mask any significant short-term peak concentrations produced by the model. It is agreed that it is these concentrations, rather than the annual average or long-term exposure, that pose a risk to health as a result of this

development. Professor Sokhi conceded that the effect on long-term average and short-term peak data of modifying the emission factor would be different.

3.4.10 The distinction between long term average concentrations (expressed as an annual average) and the associated health impacts and short-term averages (hourly or 24 hours) and the associated health impacts is crucial in this context, where it is agreed that the health risks identified to especially vulnerable groups arises from the latter. In cross-examination, Professor Sokhi conceded that there was a complete absence of short-term modelling in the Redmore AQA. There is therefore an information vacuum within the Redmore AQA concerning the very concentration levels on which the HIA was confident enough (despite all of Professor Sokhi's caveats on assessing health impacts in small populations) to come to a conclusion of 'minor adverse' and 'not significant'. In other words, the very information you would want to have to assess health impacts from short-term elevated concentrations is missing from the Appellants' and the HIA's evidence base.

3.4.11 Professor Sokhi agreed that short-term peak concentrations could be associated with reduced quality of life effects for vulnerable individuals that might fall short of an exacerbation precipitating asthma attack, namely reduced mobility and increased periods of staying indoors due to the need to avoid exposure to high short-term peak concentrations. The prevalence of reduced activity days as a result of air pollution is helpfully illustrated by the health pyramid of air quality related health impacts provided by Mr Barrowcliffe [fig 5.2]. It is agreed that the weather conditions producing these peak concentrations are consistent with hot summer days (for example Professor Sokhi cited the heatwave we have just experienced) when members of the local community more like to be outside and want to be outside. Professor Sokhi agreed that such limitations on mobility would not be consistent with a high quality of life (something which the MLP requires to be protected) and it follows that this would also not be an acceptable health impact. Again, although this health impact was referred to obliquely in the HIA, the focus was on the actual

exacerbation of symptoms and did not give any obvious consideration to this lower scale, nonetheless unacceptable health impact. Mr Barrowcliffe also makes the point that there is a still wider range of health effects associated with PM exposure that hasn't been expressly addressed in HIA and would ask the question as to whether the SoS can have confidence that they have all been considered when assessing the risks to the local population.

- 3.4.12 Second, the emission factors themselves are subject to inherent uncertainty, as stated in the relevant IAQM guidance [CD/35] and as acknowledged by Professor Sokhi. Professor Sokhi's response to this has been that any uncertainty in the emission factor and therefore the model will have been compensated for by Redmore's use of a worst-case scenario. However, this worst-case scenario was limited by Redmore to emission factors in the 'low' (moderate facility, well maintained) or 'medium' (average age, well-maintained) categories [Redmore Appendices, pg. 124]. It did not consider an emission factor in the 'medium high' category for older but well-maintained plant, despite the fact that as Professor Sokhi conceded it could not be ruled out that this category might represent the operational profile of the quarry. It was also suggested by Professor Sokhi in reply to the Inspector's questions that the emissions factors did not take account of the moisture content of the material to be extracted. In doing so, Professor Sokhi was going much further than in his proof which only says that the moisture content of sand and gravel may be lower than other minerals in the activity category. This implies that within the category of quarrying activity the emission factors take into account the varying moisture content of the different materials extracted. In any event, as Professor Sokhi acknowledged, the moisture content of the material at the site will be variable, including in specific hot weather conditions. Given the above, it is questionable whether it can truly be said that a worst-case scenario has been used. Certainly this approach is not sufficient to address Mr Barrowcliffe's concerns as to the underestimation in Redmore's modelling, due to the 'double-dilution' of the modelled emissions as well as the inherent uncertainty in the emission factors themselves.

- 3.4.13 Ms Tafur questioned Mr Barrowcliffe on Air Quality Consultants' statement to the DPH that the Redmore AQA may have overestimated the emissions from the quarry. While she invited Professor Sokhi to speculate on the reasons underlying that statement, neither he nor the Appellants can correctly place weight on that statement when it is unsupported by AQC's own reasons.
- 3.4.14 Mr Barrowcliffe's view is that even on a comparison with the IAQM 2016 data set [CD35, appendix 2], which was drawn to the Inspector's attention in Mr Barrowcliffe's proof, shows underestimation of the effects of the quarry within a broad envelope of out to 400m, which is a distance that would include Bengoe School. Professor Sokhi agreed that this is one of the few UK data sets for quarry emissions that we have and failed, despite Ms Tafur's line of questioning, to provide convincing evidence that the data set was not representative of this quarry and could not be used as a yardstick for comparison.
- 3.4.15 Although Ms Tafur took Professor Sokhi through a numbers exercise in the Inquiry, the Redmore AQA did not quantitatively assess RCS nor was it dealt with in HIA at all, despite the fact that it is agreed between Professor Sokhi and Mr Barrowcliffe that RCS is a hazard to health.
- 3.4.16 There is no definition of 'minor adverse' in the HIA meaning that it is entirely unclear why, having identified an adverse health impact, Mr Cave decided it was minor as opposed to simply being 'adverse'. Given Professor Sokhi's comment that you cannot predict health impacts for small populations with confidence, it is left to the reader to speculate as to where the dividing line was drawn. Without wishing to be flippant about health conditions, it is open to ask whether such a difference can be quantified in the number of asthma attacks suffered in a year? Or is it that asthma exacerbation was not considered to be a sufficient adverse health impact (which is something which those who have experienced an asthma attack would certainly disagree)? In the absence of a

definition of the risk itself and in the absence of a recognised framework – the HIA equivalent of the IAQM guidance - this categorisation is essentially meaningless.

3.4.17 Mr Cave's assessment of significance – and likewise Professor Sokhi's own conclusion of no material risk which is also undefined and unquantified - is an entirely subjective decision based on a framework devised by Mr Cave. Although there is reference in his proof to a framework being used by Public Health Wales, that framework is not before the Inquiry and Mr Barrowcliffe observed that there are references to multiple other frameworks that have been proposed by other groups. While it is true that Mr Cave did not have any choice but to devise a framework, given the lack of a common one, it is still fair to comment that his treatment of significance of the adverse health impact he identifies cannot easily be extrapolated and compared against other conclusions. It is for this reason that Mr Barrowcliffe has stated that he avoids drawing a conclusion as to significance. Given the lack of a commonly accepted framework and the consequences of coming to a decision on significance in the planning context, this is not something that should be ascribed by an HIA which should comment on the magnitude of the risks identified and leave the attribution of significance to the ultimate decision maker, in this case the SoS.

3.4.18 As in the case of water pollution, both Mr Cave and Professor Sokhi place considerable and understandable emphasis on the mitigation measures to be in place at the site. Again, there are notable gaps in the information provided by the Appellants on this front. In particular, Professor Sokhi stated that he would have wanted to be sure that there was a robust Dust Management Plan in place, including to address a specific concern about the trackout of materials by vehicles leaving the site which he did not think had been addressed. Despite his request, and indeed despite the comments of AQC (in their March 2018 initial views) [File 4, HCC Witnesses, doc. 17, pg. 23, ¶4] and Jim McManus (DPH) [File 4, HCC Witnesses, doc. 15, pg.7, ¶2.13 and pg.11, ¶3.3] as to the

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Dust Management Plan being a notable omission from the Appellants' applications, the document has never been provided. When cross-examined on this point, Mr Symes response was that the requests came after the appeal documents had been submitted and that in any event the Dust Management Plan would be produced later. This is not a sufficient explanation as to the ongoing absence of this crucial element of dust impact mitigation and therefore health related impact mitigation in light of the number of occasions on which this point has been raised or the fact that the Appellants' own expert felt he did not have all the information he would have wanted in carrying out his review of this area of the Appellants' case. Again, the SoS will have to decide before granting planning permission whether any unacceptable impacts of the development can be rendered acceptable in planning terms by mitigation that will be enshrined in planning conditions. The SoS therefore needs to have the full picture on mitigation, especially crucial elements such as the Dust Management plan at the decision stage. It is not sufficient to say that the LA will not implement a bad dust management plan. While this may be a safe assumption to make, the decision as to the acceptability of the proposed development is one for the SoS to make, including, as suggested by Professor Sokhi and Mr Barrowcliffe, whether that Dust Management Plan might include provisions for the cessation of operations in specific weather conditions.

- 3.5 In summary, it is SBQ's position that the possibility of health effects on vulnerable groups as identified in the HIA and further explored by Mr Barrowcliffe is sufficiently likely and sufficiently severe as to constitute an unacceptable adverse impact within the policy framework. The evidence base of the Redmore AQA on which the HIA relied in assessing the health impact on vulnerable groups omits key information as to short-term peak concentrations and in its modelling of long-term averages may include underestimation as a result of the treatment of what was already an inherently uncertain emission factor. The HIA makes no attempt, within its own framework which lacks any definition of the key term 'minor adverse', to quantify the health impact on the vulnerable members of the local community. On the basis of Professor Sokhi's assertion that this is an uncertain exercise in any event, the conclusion logically follows

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that if the SoS cannot say with certainty whether or not a health impact will be acceptable or unacceptable it is best to adopt the precautionary approach that it is unacceptable and refuse permission for the development.

4. CONDITIONS

- 4.1 At the time of writing, the discussion on conditions has not yet been undertaken so I will not comment on the specifics of the conditions currently proposed. SBQ has submitted to the Inquiry a schedule of its comments on the draft conditions prepared between the Appellants and the local authority in advance of the Inquiry, along with a proposal for water management conditions and a proposal (contained in Mr Barrowcliffe's Appendix B) regarding air quality monitoring. It is SBQ's view that in the event planning permission is granted, it should be granted with these conditions as they afford the groundwater resources and the local community the highest level of protection in these areas.
- 4.2 As to the position on mitigation and conditions generally, a key theme that has run through the Appellants' case on both water pollution and air quality related impacts is that the absence of the details of specific mitigation relied on by their experts in assessing risks from the site will not be problematic for the SoS coming to his own decision on the acceptability or otherwise of the proposed development. They assert that it can be taken as read that any and all categories of mitigation relied on by them at this Inquiry will be delivered in the future. This position has been maintained even in the face of challenges from us, and questions from their own expert and initially the DPH as to the details of the site-specific mitigation proposed. Given that, should permission be granted, they would have to produce dust management and water management plans, you would have thought that given the site-specific concerns in play it would have been reasonable to expect to have these gaps in the picture filled in, both for the SoS so that an informed decision can be made as to acceptability and for the local community who are not reassured, and in fact whose concerns have been exacerbated by the Appellants' 'mañana, mañana' approach.

- 4.3 Regardless of the assertions made by Mr Symes or Mr Sutton as the witnesses regarding the operational aspect of the development, in the context of an appeal where you are asking the SoS to make the final decision on the acceptability of a development, which de facto includes a decision on the need for and adequacy of any mitigation and conditions required to make it so, this position is not acceptable. Whilst it might be true that it would be disproportionate to expect every tiny detail of the operational scheme to have been ironed out at this stage, that is an entirely different proposition from the absence of entire aspects of site-specific mitigation. The Appellants need to show to the satisfaction of the SoS that the risks associated with the site have been properly and comprehensively assessed, that they can be mitigated and that that mitigation can be put in place by way of planning conditions. On the basis of the evidence before the Inquiry, the Appellants have failed to do this.
- 4.4 In relation to the issue of enforcement, which is a topic of significant concern to the local population due to its previous experience of Rickneys quarry, which the Inspector saw on his site visit, the SoS has been invited to place significant weight on the record of the proposed operator for the Ware Park site, Ingrebourne Valley Ltd (“IVL”). However, as has been pointed out on each occasion, this planning permission will run with the land with the consequence that any operator could at any point during the life of the site replace IVL and take responsibility for adhering to conditions. As shown by the current state of Rickneys, it cannot be assumed that all operators adhere to best practice or indeed can, as Mr Symes acknowledged during cross-examination, deliver what had been imposed by way of planning conditions. In light of this, little weight should be attributed to the record of IVL in determining whether the development would be acceptable in planning terms.
- 4.5 On a related note, Mr Symes also invited the SoS to give weight to the fact that – he asserted without any supporting evidence - private legal agreement(s) between RJD and the landowner of the site included requirements for the delivery of site restoration. However, he swiftly conceded that this private law relationship between operator and landowner was of no relevance as any private arrangement between these parties was not subject to public scrutiny nor could any obligations be enforced against them by

third parties. Any other controls that need to be put in place to render the proposed development acceptable in planning terms will need to be dealt with by way of enforceable conditions within the planning system.

5. CONCLUSION

- 5.1. It is agreed between the parties that the proposed development could have an unacceptable adverse impact on the Chalk aquifer and consequently the public water supply at the Wadesmill Rd PWS. The proposed development can therefore not be permitted unless the Appellants can demonstrate that appropriate measures can be imposed to mitigate that impact. The mitigation measures proposed by the Appellants are, for the reasons given above, wholly insufficient to mitigate the serious potential impact of pollution on the Chalk aquifer. Planning permission for the proposed development – whether the original or the amended scheme – should therefore be refused.
- 5.2. As to air quality, the Health Impact assessment has been unable to demonstrate that the health impact for vulnerable groups of the local community arising from short term peak concentrations of PM would not be unacceptable for the purposes of the policy framework. On this basis, planning permission should also be refused.
- 5.3. By way of a final comment on the Appellants' attitude to the acceptability of the impacts of the proposed development on the local community, Mr Symes has on various occasions commented that you would not want to put new houses in the immediate vicinity of an active quarry. This is a reference to Hert4, a housing development to be delivered on the property of the landowner of Ware Park. The logic behind these comments is obvious. People will understandably be unwilling to buy properties and put their keys in the door of Hert4 houses when they know that they will be suffering the impacts from the quarry. Reversing this logic from Mr Symes, how can it reasonably be said that it is any more desirable or acceptable to put a quarry in the immediate vicinity of existing homes and a thriving primary school?

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