

**APP/M1900/W/21/3278097**  
**WITNESS STATEMENT**

**Groundwater management plan and public water resources matters  
significant to  
The proposed quarrying activity at the Hatfield Aerodrome**

By:	Michael Hartung - Member of Ellenbrook Area Residents Association
Date:	17 October, 2021
Use:	Appeal <b>APP/M1900/W/21/3278097</b> (Nov. 2021) on rejection of proposed quarrying activity, Hatfield Aerodrome
Witness called by:	Ellenbrook Area Residents Association (EARA) and Smallford Residents Associations (SRA)

## Water Monitoring & Management & the Groundwater Water Management Plan.

### 1. Introduction

- 1.1 Before planning permission is granted the Environment Agency (EA) recommended that Brett Aggregates require a Water Monitoring and Management Plan (WMMP) for long term management and each event of the quarry. The company prepared a Groundwater Management Plan final V5 (GWMP).  
The WMMP had built in contingency actions arising from monitoring that will be submitted to the Mineral Planning Authority in stage development.  
That is, planning permission should be granted subject to conditions for each phase of the quarry.
- 1.2 The GWMP details construction of the lagoons, discharge point for Upper Mineral Lagoon back-drain, monitoring during and post operational phase. However, this plan only operates during the quarry lifetime and not before.
- 1.3 We believe that the GWMP fails both **before** and after commencement of the quarrying. The plan assumes the problems will be picked up after the quarry is given planning permission and does not look at the events leading up to the commencement of the quarry.
- 1.4 The plan seeks to “protect controlled waters and to not exacerbate the existing groundwater pollution” and assumes the land beneath the quarry is unpolluted.
- 1.5 We believe that this assumption that the land beneath the quarry is not polluted is incorrect. We believe that we have enough information to prove that the land nearby and underneath the planned site is already polluted with bromide and bromate in the lower aquifer where sand and gravel is to be extracted. Bromate boreholes within the site are shown on document (005), closeness to the plume document (006 and 027a/b), bromide map & chart (042). Data from SLR 2019 chart points to boreholes within the site showing bromate over the threshold of 0.5µg/l  $\text{BrO}_3^-$  – boreholes BH 103,104,106,301 and outside the site on boreholes BH105,108,201, BHB.
- 1.6 We have continually requested that further boreholes in the actual dig site are installed pre quarrying to evaluate and confirm that the area is free of pollution. This position has also been recommended by Dr Rivett.

At the HCC DCC planning meeting on 18<sup>th</sup> December 2019 the councillors asked, *“would the boreholes be checked during this time or any new boreholes made to check?”*, and the response from Simon Tracy Planning Director Brett Aggregate was *“continue to monitor the boreholes in the area up to 2021 and beyond and in addition install additional monitoring boreholes”*. As far as we are aware no further borehole data has been supplied and no additional boreholes have been installed. This is not an acceptable position.

- 1.7 If the GWMP is not sound, then it impacts on other situations such as the pollution spreading and cross contamination. A diverted plume will eventually contaminate nearby Roestock & Tyttenhanger public water supplies. It will reduce the influence of Bishops Rise in its remedial work, thereby threatening Essendon PWS together with other water receptors in the East of the county.
- 1.8 Miscalculation as to climate change and increased rainfall will bear direct responsibility to downstream flooding. The lagoons do not have sufficient capacity to absorb this excess rainfall. A detailed analysis of the flood risk can be found in document (019) and in a further witness statement on flooding.
- 1.9 A further analysis of the GWMP and its technical failings are in document (041) and covered here in summary.

## 2. Specific issues relating to GWMP

### 2.1 Extraction of gravel from phases A to G

- 2.2 The quarry planning application when referring to the upper mineral horizon gravel extraction states that *"A 4m -10m clay buttress keyed into the underlying interburden (clay) will form a clay buttress around each phase, isolating the upper mineral aquifer UMA from each phase."*
- 2.3 We believe that this will result in the ground water flow being diverted around these buttresses as they effectively form clay barriers. This will change the natural flow of water in the aquifer. We believe that this is a high risk strategy and breaks the EA condition (ii) *that any activity close to the plume must not change the existing hydrogeological flow regime.*

### 2.4 Lower mineral horizon gravel extraction

- 2.5 As described in the GMWP the UMH gravel will be extracted and dewatered allowing work to begin on the lower mineral gravel extraction. This will depend on seasonal conditions when the LMA level is low. The minerals are expected to be worked wet.  
The interburden is removed in a small slot 100m x 30m and minerals exposed. Depending on hydrological conditions and confined aquifers, pumping of water may be required. In all conditions the operation is working in a wet environment.  
Mechanical extraction is done from the interburden ledge and stockpiled on a raised bench. A second move is required to bring the wet minerals to ground level.
- 2.6 We believe that working in wet conditions can allow cross contamination of the two aquifers and presents a very high risk. Removing so much water from the LMA may cause a drawdown effect and potentially drag in bromate to the site. This method of working produces a large amount of wastewater which must

be cleaned and filtered before it is reintroduced back into the aquifer via the LML.

The LML is also under threat from contamination from the bromate. Worryingly there is no mention of the trigger point values that are set by the EA in version 5 of the GWMP.

- 2.7 *"When the piezometric level exists above the interburden horizon"* If this condition occurs, then no amount of pumping will lower the water level in the work area, equipment will have to be removed and extraction stopped. The extra time added must **increase** the estimated timescale of each phase by 1 year.

## 2.8 Three filter ponds

- 2.9 Brett's method of working will include three small filter ponds. All washing, and construction water must be cleaned and filtered before it is pumped back to the aquifers via the upper mineral lagoon (UML) & lower mineral lagoon (LML). The reason is to prevent silting up and blocking.
- 2.10 The filter ponds shown in the plant diagram seem to be too small to do this job and should be split to do different functions. A total of four lagoons are required, one pair attached to the UMH and second pair to the LMH.
- 2.11 Groundwater from the UML is used to wash the gravel (mineral), it is then pumped to a pond in the plant area. The silt is left to settle, and water pumped back into the LML. From drawing HA-PCC-C9 it appears to show three small ponds of some 85m in length. We have no detail of the exact size, but they appear to be too small to operate effectively. The silt ponds should be split to do different functions. One to be connected to the UML and the second to the LML, there must be no mixing between them. This is to isolate them and avoid cross contamination.
- 2.12 If the silt removal is not effective, then the upper mineral lagoon (UMH) will be subject to silting up. Recharge back into the aquifer will be restricted therefore groundwater cannot be adequately managed.

## 2.13 Excess rainfall on site

- 2.14 EARA and SRA believe that excess rainfall has NOT been included in the GWMP calculations, potentially leading to flooding.

<b>Predicted volumes of water to be managed in UML:</b>	<b>m<sup>3</sup>/day</b>
Dewatering discharge for UMH clay buttress construction	750 to 1000
Back drain	225 to 645
UMH groundwater and rainfall in each phase	122 to 164
<b>TOTAL</b>	<b>1097 to 1809</b>

<b>UMH lagoon infiltration capacity</b>	<b>1,100 to 2300</b>
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- 2.15 The above calculation demonstrates that the UML lagoon is balanced, however excess rainfall has NOT been included in the calculation.
- 2.16 The lagoon will be unbalanced if excess rainfall is added to the calculation: inflowing extra rainfall on the whole site @20,842m<sup>3</sup>/hour (1%AEP storm) 80% runoff would breach the 1m rim and cause potential flooding. (doc 019)
- 2.17 Incident rainfall and runoff
- 2.18 Rainfall and mineral working (possibly with bromate) will be infiltrated into the ground upper mineral aquifer (UMA). That surface water will recharge the Nast Brook and discharge into the Ellen Brook.  
This high-risk action will cause cross contamination of the aquifers and resultant discharges into the river system. All surface water and mineral water should be contained on the site.
- 2.19 Lower Mineral Lagoon depth
- 2.20 Brett's method of working uses a clay buttress around the perimeter of each phase and again this is a high-risk strategy.
- 2.21 The optimal time for construction of the lower mineral lagoon is when the groundwater is lowest. The interburden (clay barrier) will be excavated down to its base. The depth of the LML is at 62mAOD that is 14m below ground level.
- 2.22 Due to the proximity of the bromate just outside this site, there is a high risk that the plume will be drawn into the LML construction area. The depth of this lagoon suggests it descends into the lower mineral horizon (LMH) and has direct hydrological contact with the Lower Mineral Aquifer.  
*SLR drawing 011 Stage C*
- 2.23 Proximity to Cemex site
- 2.24 Whilst the Application concentrates on the actual quarry site and the GWMP, it is silent on the impact to the GWMP in respect of the surrounding area. This is a particularly worrying omission as it is clear that the Cemex Quarry is subject to a stringent GWMP rigorously enforced by the EA yet the impact of the new quarry on this is not recognised or considered.
- 2.25 As stated previously the quarrying on the Cemex site concentrates on the UMH and does not reach anywhere close to the LMH and the Chalk Aquifer. This is due to the strong recognition that the LMH and the quarrying could impact the movement of the bromate plume. Indeed, Cemex have in the past quarried the LMH. However, upon detection of the plume they ceased this due to the problems they encountered. An area of their site bordering the proposed Brett quarry site is off limits with many warning notices due to

bromate contamination resulting from quarrying before the Bromate Plume was detected.

- 2.26 It is interesting given their experience with the bromate plume that CEMEX with their already fully established processing plant on the boundary with the proposed new quarry have not sought to quarry Ellenbrook Fields and we can only assume this is on the basis that they would only take the UMH due to their experience with the LMH and as such the site becomes unviable.
- 2.27 The impact of the Brett GWMP takes no consideration of the CEMEX GWMP which uses a network of lagoons on site to control the water. The risk of this being disturbed and water being sucked away from the CEMEX site is not considered by Brett or indeed CEMEX though we believe that the implications of this have recently become apparent to CEMEX and is causing some concern given that they will operate for at least a further ten years on the site and the need to keep their water on site.
- 2.28 It seems appropriate that an overall GWMP is prepared, considering all quarries operating in the area and dealing with all concerns in respect of the bromate contamination and indeed the water run-off and control. This GWMP should at least cover the area quarried by CEMEX and the proposed new site and consider the interaction of both facilities as well as the impact on the locality.
- 2.29 It is a fact that the CEMEX site is heavily monitored by the EA in respect of the bromate plume with monthly and weekly sampling and a great deal of data and control being collected and exerted by the EA on the activities there. It seems incongruous that a 100m away the attitude of the EA appears to be one of relaxed monitoring after quarrying has commenced and without insisting that boreholes are available on the dig site.
- 2.30 Affinity Waters' lack of objection to the Brett proposal seems to be in contradiction to their objection to the extension of the neighbouring quarry at Furze Field and Stanborough. This is even more strange as Cemex do not touch the LMH aquifer and only extract dry gravel from the UMH.

### 3. Public Water Resources

- 3.1 The following are extracts from a letter sent to Chay Dempster at Herts County Council from Julie Smith Affinity Water. 18th December 2018 (044). This letter is before the agreement between Brett and Affinity Water was reached.  
We are really concerned that Affinity Water can move from the position described in this letter to not objecting to the quarry application when very little has changed apart from them having a private operating agreement between the two companies.

## Extracts from letter from Affinity Legal Department to HCC - 2018

*"We do not, however, consider **the GMWP alone is sufficient** to ensure that the proposed quarrying activities pursuant to the proposed permission do not affect the mobilisation of the existing plume of bromate contamination, and thereby render the water currently abstracted by Affinity Water at our Tyttenhanger and Roestock Chalk groundwater sources unfit for public water supply purposes."*

*"There is a risk that quarrying activity could direct the plume towards the south impacting on existing public water supplies at Tyttenhanger and Roestock. They are important and long standing public water supply sources, and it is essential that an appropriate regime is in place to avoid the proposed quarrying activities impacting on the protection of the supply sources from the bromate plume." (044)*

- 3.1.1 We believe that this risk to the public water supply contravenes MLP policies 17 and 18.

*Policy 17 Point iv) states:*

*"All proposals for mineral extraction and related development (including after uses):*

*iv) shall not be permitted if the development and/or subsequent after use would have a negative quantitative and/or qualitative impact on the water environment, including main rivers, ordinary water courses and groundwater resources, unless appropriate measures can be imposed to mitigate any harmful effects;"*

It is difficult to imagine how quarrying on this land would not have a negative effect on groundwater resources.

*Policy 18 Point ix) states:*

*All proposals for mineral extraction and related development shall, where appropriate:*

*ix) demonstrate that no significant degradation of the air (particularly from dust and emissions) or water quality or quantity –with respect to both groundwater and surface water will occur;*

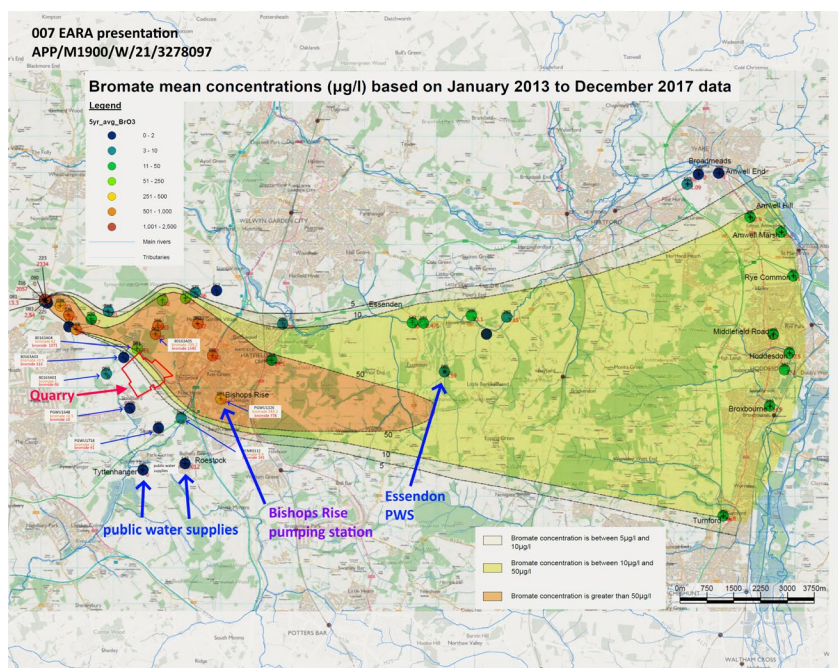
It is difficult to imagine how quarrying on this land will not cause significant degradation of the water quality or quantity.

## 3.2 Our water supply

- 3.2.1 The bromate plume has already affected the land and consequently the water supply in Hertfordshire. Two local pumping stations have already

been affected by the plume; one in Hatfield (Bishops Rise) had to be closed when it was realised this was putting contaminated water into the public water systems, and one in Essendon which is closely monitored to ensure that the drinking water remains below WHO guidelines. If the plume moves in a southerly direction due to quarrying activity, there is a threat to the remaining uncontaminated water pumping stations at Tyttenhanger and Roestock. We do not believe that any risks to the remaining supplies in the area should be taken, particularly as Affinity Water have recently stated that there is potential for water shortages.

The map below shows just how close the bromate plume is to the public water supplies. Map of bromate plume & PWS (007).



- 3.2.2 We recognise the importance of the remediation work (circa 2008) to remove the bromate that has been undertaken by Affinity Water, who operate the pumping station at Bishops Rise Hatfield. However, over the past 10 years this remediation work has sadly failed, despite the huge financial cost and more importantly the ongoing loss of trillions of litres of precious and scarce water and this has made no noticeable difference to the level of contamination. A Drought Consultation document (008) explains the relationship between drought and wasting water at Bishops Rise to scavenge bromate.
- 3.2.3 However, we have to put the protection of our water supplies first and not have a plan to manage the consequences if / when the plan fails. We are aware that Affinity Water will not put contaminated water into the public



network, but we will risk losing valuable resources for decades to come if any bromate leaks into the source water area.

- 3.2.4 The following are extracts from a speech made by Dr Bryan Lovell, OBE, CGeol, a geologist based at the University of Cambridge regarding the pollution impact on a proposed quarry at Bengoe.

*"The problem with the chalk aquifer is this: very quick pollution, very slow decontamination"*

*"Monitoring of pollution as it takes place is not the main issue: pollution must be prevented from the word go".*

This quote speaks for itself and does not require any further explanation.

#### 4. Conclusion

- 4.1 We do not believe that the ground water management plan is a strong enough safeguard and is too high a risk to take with the source water. Putting our water supply at any risk seems to be a highly dangerous strategy. Once the aquifer is contaminated it is too late.
- 4.2 We believe that the proposal is contrary to the provisions of the Hertfordshire mineral local plan (policy 17(iv)) and 18 (ix).
- 4.3 We believe the GWMP has the responsibility to do the following:
- Protect the public water supplies
  - Prevent cross contamination
  - Prevent local flooding
  - Facilitate the EA remediation plan

The GWMP potentially has a direct influence on public water supplies, bromate contamination of groundwater, local flooding downstream of the site and EA's second remediation plan and it must provide cast iron guarantees that quarrying will be safe and can deliver its responsibilities.

- 4.4 EARA & SRA believe that the GWMP will not be able to fulfil those responsibilities and is unsound and therefore no quarrying activity should be permitted on Ellenbrook Fields.