

**IN RESPECT OF THE APPEAL AGAINST THE DECISION OF
HERTFORDSHIRE COUNTY COUNCIL FOR THE DEVELOPMENT OF
LAND AT HATFIELD AERODROME, OFF HATFIELD ROAD,
HATFIELD, HERTFORDSHIRE
PLANNING INSPECTORATE REF: APP/M1900/W/24/3346607
LOCAL PLANNING AUTHORITY REF: PL/0232/21**

**Paper submitted by former Rule 6 parties now third parties at the
request of the Planning Inspector**

Flooding

This is an additional objection to the planning application based on the flood risk to the area surrounding the quarry site.

Ellenbrook Area Residents Association (EARA) has a number of concerns about flooding risks caused by the proposed quarry in addition to the issues raised previously regarding the bromate pollution.

These can be summarised as follows:

1. Increased flood risk due to the impact of climate change
2. Flood risk to the surrounding area if the proposed lagoons overflow
3. Changes to the hydrogeological regime of the flow of the aquifer
4. The impact of changing large swathes of land from permeable to non / lower permeable land and the resulting run off of large quantities of surface water

The concerns raised above are discussed in more detail below.

The location

A proposed quarry site is located to the west of Hatfield, and to the north of the A1057, the original 172 hectares was known as Hatfield Aerodrome.

The Hatfield Aerodrome was once owned and run by BAe systems. It was sold to a property developer in 2000.

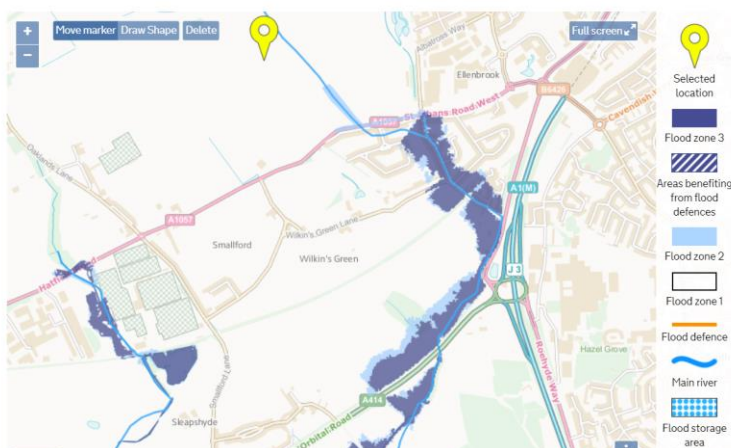
The land slopes from 80m AOD (80m above sea level) in the N.W to 73 AOD in the S.E. as a result natural surface water runs into the NAST, an ephemeral brook crossing the site where it eventually joins the Ellenbrook River just south of the A1057 road

Issue 1 - Increased flood risk due to the impact of climate change

It is clear from recent weather events across England that there is no doubt that climate change is here, and that flooding is no longer a rare event but one that is increasingly occurring.

The area south of the proposed quarry site has already been identified as a flood risk by the Environment Agency. The map below shows the location of the quarry (selected location) and just south of the site flood zones 2 (medium probability light blue) and 3 (high probability dark blue) covering areas of Ellenbrook and Smallford.

Environment Agency flood map

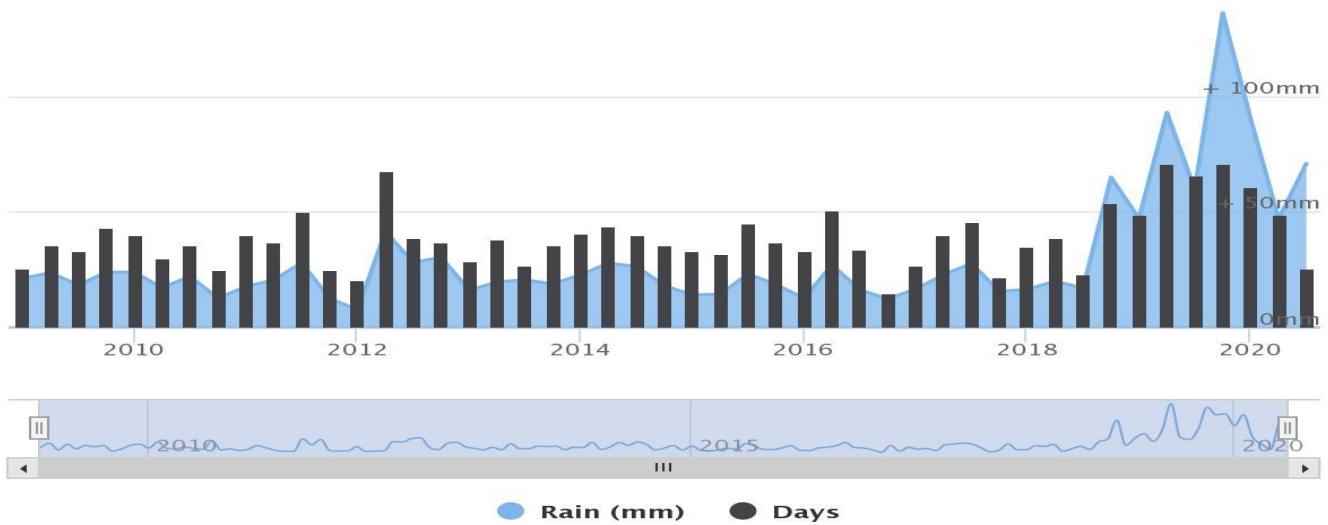


Data shows that the annual rainfall and the number of rainy days has increased dramatically over the last 3 years, threatening these flood zones in the area of Ellenbrook and Smallford. See graph below based on historical data from WorldWeatherOnline.

St Albans

Average Rainfall Amount (mm) and Rainy Days

Zoom 1m 3m 6m YTD 1y **All**



WorldWeatherOnline.com

Information from the Rothamsted Research Centre in Harpenden demonstrates the extreme weather conditions that are being experienced in the UK. August 2020 was very wet with below average sunshine. Rainfall was above average with 172 mm, which was a staggering +108.27 mm above the August average. The highest rainfall 42.8mm occurred on 13th August, followed closely by 15th August with 41.2mm. August 2020 was the wettest recorded since rainfall records began in 1853.

In an area already identified as a significant flood risk any additional development which has the potential to increase the flood risk to the area should be researched very carefully and so the risks completely minimised.

Changes in climatic conditions can affect local flood risk in several ways; however the impacts will depend on local conditions and vulnerability. Wetter winters and more intense rainfall may increase river flooding in both rural and urban catchments. More intense rainfall causes greater surface runoff, increasing localised flooding and erosion. In turn, this may increase pressure on drains, sewers and water quality. Storm intensity in summer could increase even in drier summers, so the county needs to be prepared for the risks arising from unexpected flash flooding.

The local flood risk management strategy for Hertfordshire identifies that flooding from surface water, groundwater, rivers and ordinary watercourses is expected to increase in frequency and severity as a result of climate change.

The EA suggest that the level of flood risk will not increase, however parts of Ellenbrook and Smallford are already at the highest level of risk according to the EA flood maps for both surface and river water flooding, this is supported by the flood alert that was raised for this area on 28th August 2020.

The current flood defences are at full capacity, any additional water coming as a result of the quarry process will mean that the high level of risk we are at already will be accompanied by an increase in occurrence, putting the area at greater all-round risk of experiencing a severe flood.

Photographs demonstrating recent water levels in the Ellen Brook

Ellen Brook, Ellenbrook Lane

Full capacity Feb 2020



Half capacity Sept 2020



Recent picture showing the flooding on A1057 junction of Ellenbrook Lane



EARA are concerned that responses from the EA regarding the flood risk are based on 2016 information, which is significantly out of date. We believe that there is a significant chance of flooding to the residential homes of Ellenbrook, Smallford, SW Hatfield, and to the University of Hertfordshire due to the impact of climate change and the removal of permeable land.

Where an area such as Ellenbrook is already identified as a Zone 3 flood risk and the level of rainfall has increased substantially over recent years then it would seem vital that the Environment Agency should reassess the flooding risk based on more up to date information.

In May 2016 the EA objected to planning permission for the quarry with concerns over downstream flooding and moving the NAST brook. This was later lifted on 5th September 2016, before the application came to the full DCC planning on 25th January 2017.

We believe that the EA withdrew their objection based on information available in 2016 and that the increase in rainfall and the increased likelihood of extreme flood events should be reassessed by the EA. We consider that their four objections (shown below) are more relevant than ever today, and the objection should not have been lifted.

Environment Agency position

In the absence of an acceptable Flood Risk Assessment (FRA) we object to the grant of planning permission and recommend refusal on this basis for the following reasons:

Reason

The FRA submitted with this application does not comply with the requirements set out in paragraph 9 the Technical Guide to the National Planning Policy Framework. The submitted FRA does not therefore, provide a suitable basis for assessment to be made of the flood risks arising from the proposed development. In particular, the submitted FRA fails to:

1. Ensure that any off-site flood risk from the development site does not increase the risk of flooding to downstream properties in extreme flood events.
2. Demonstrate that the diversion proposals for the River Nast will not increase the risk of flooding on the development site in extreme flood events.
3. Consider the temporary diversion of the River Nast in an open channel.
4. Consider an open channel watercourse on the proposed permanent line of the River Nast after restoration.

This objection is in line with your Waste Core Strategy Policy 16: Soil Air and

Environment Agency
Apollo Court, 2 Bishops Sq Business park, Hatfield, Herts, AL10 9EX.



Environment
Agency

Our ref: NE/2016/124652/01-L01

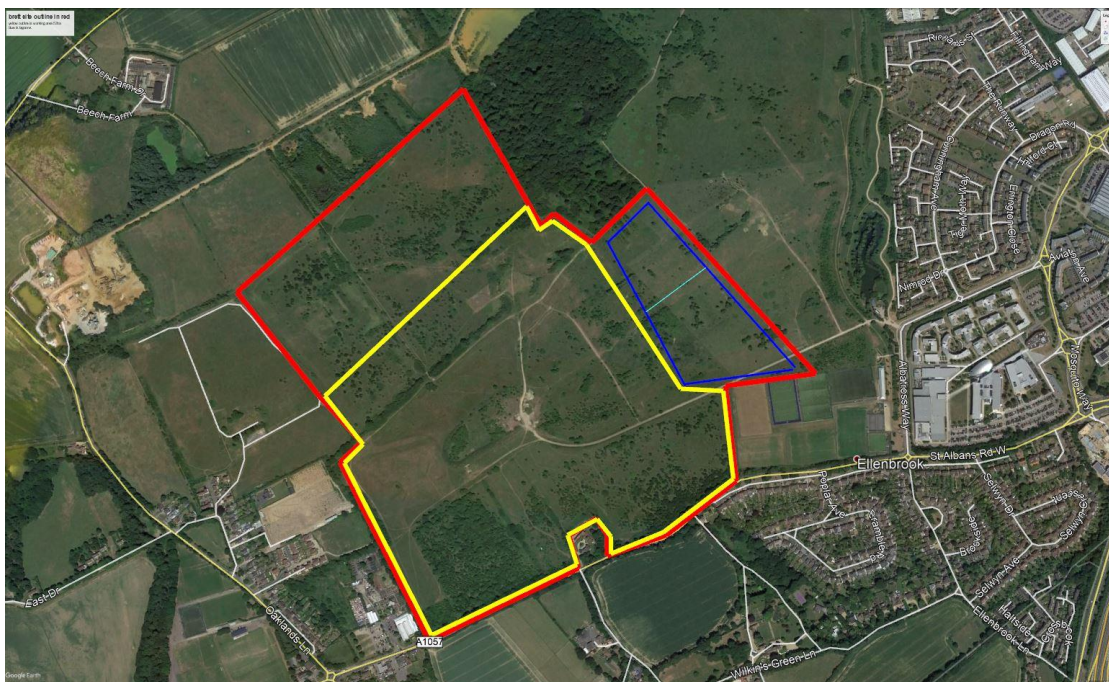
Your ref: PL10755\16

Date: 25 May 2016

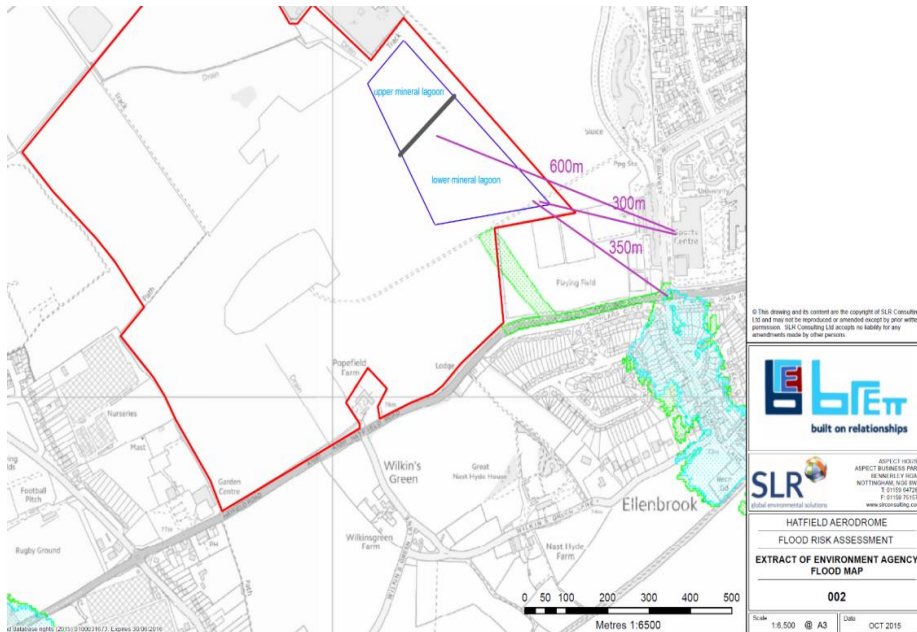
Issue 2 - Flood risk to the surrounding area if the proposed lagoons overflow

For the quarry to operate, as the sand is dug out, so it needs to get rid of excess water. The proposal is that this excess water will be stored in specially constructed lagoons and the water will infiltrate back into the ground over time.

The quarry site is huge covering 86 hectares in total (shown in red) with a working area of 53 hectares (shown in yellow) which excludes the lagoons (blue) and plant site, as shown on the map below:



The quarry site is located in close proximity to the University of Hertfordshire, a busy main road and housing. The map below shows a natural slope to the S.E and a short distance of 300 metres (to the university). It also shows how vulnerable we are to the lagoons and subsequent flooding from them.



Issue 3 – Changes to the hydrogeological regime of the flow of the aquifer

The Environment Agency has recommended a number of conditions as part of their response to the planning application that should be met as follows:

- No mineral is extracted from within the existing plume of bromate and bromide groundwater pollution
- Any activities close to the plume must not change the existing hydrogeological flow regime
- Any activities close to the plume must not interfere with the remediation of the bromate and bromide pollution.

EARA believe that the second comment regarding the hydrogeological flow regime will not be met. The reasons for this are illustrated as follows.

The final Brett Water Management Plan states-

Upper Mineral Lagoon

The UMH lagoon will be constructed after the LMH Lagoon.

*Construction of the clay buttress along the southern and western side of the UML will be undertaken in the same manner as described in Section 2.3.2 above. These buttresses will key into the interburden to provide a seal to prevent flow from the UML entering the future Phase B of the working site. There will be **no buttresses** along the north and east face of the UML **because water will need to discharge from the lagoon into the UMA and down gradient towards the northeast in the direction of groundwater flow in the UMA.***

A shallow engineered buttress will be installed from ground level to a depth of approximately 2m (74.5 m AOD) to prevent erosion of the overburden when the lagoon is operational. The UMH in the lagoon will be excavated to a depth of approximately 4.5m below the surface (72 mAOD) which approximates to the seasonal low groundwater level for the UMA at this location.

A plan showing the lagoon locations and cross sections showing the proposed construction of the infiltration lagoons are provided in Appendix 01.

From the groundwater management plan, it appears that the UMH Lagoon is designed to infiltrate water back into the UMH aquifer, this is taking water from the area which would have dissipated into the ground

throughout the dig site area and focussing the discharge back into the aquifer at a single location. The additional designed buttresses within the lagoon are designed to prevent the flow of water in all directions and prevent it going back onto the dig site. Both of these would seem to suggest that the water that will be under pressure from the lagoon will travel in a north-easterly direction towards the northern section of the university and residential area of Salisbury village. This is also the location of the Bromate Plume, albeit the plume is in the Lower Mineral Aquifer and chalk not the UMH Aquifer. This will push the water in the UMH aquifer north easterly and at a higher/faster rate than normal and will alter (raise) the piezometric level of the aquifer water in an unnatural way. It seems to us that this method of working is most definitely changing the hydrogeological flow regime in the vicinity of the bromate plume which the EA has said must not happen.

The bromate plume is in close proximity to the site and approximately 66 metres from the edge of the lagoon is borehole BH201 which shows high levels of bromate 92.6µg/l. This borehole is situated N/E of the lagoon and directly below the UMA flow direction

[illegible]

Issue 4 – The impact of changing large swathes of land from permeable to non / lower permeable land.

It is not clear how rainfall and runoff will predominantly infiltrate into the ground – the quarry working area is clay based and 80% of water will **not** be absorbed into the ground. On the working area of 53 hectares rainfall runoff must go somewhere, it is assumed it will be discharged into the upper mineral lagoon and infiltrate back into the upper mineral aquifer. Very little of the original permeable surface will be left to dissipate the water gradually.



A typical quarry with impervious area (clay)

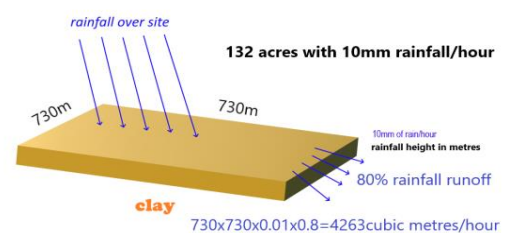
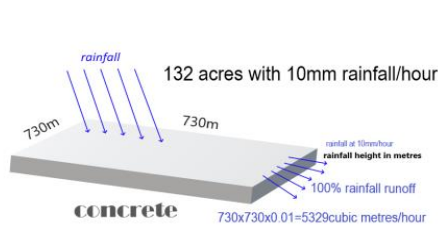


grassland permeable (no quarry)

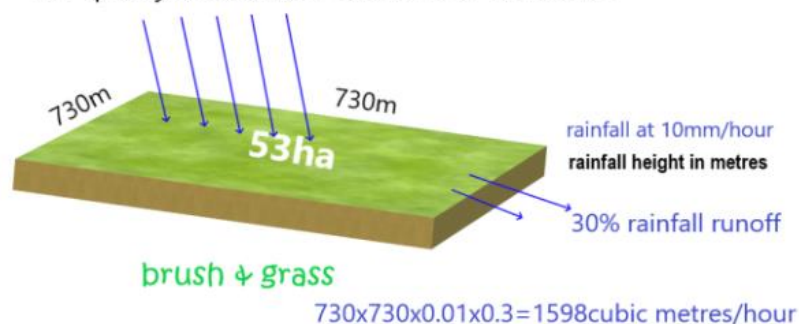
Rainfall runoff on the area is dependent on its material. The following examples illustrate the impact of different surfaces when 10mm rain falls and the volume of runoff that will be produced:

Concrete – 10mm of rain produces 5329m³/hour of water

Clay – 10mm of rain produces 4263m³/hour of water



The quarry area is 53.4 hectares or 132 acres



Untouched fields, before the quarrying, produces a low runoff of 1598 m³/hour of water

The examples above show that de-vegetation on the whole site could contribute a difference of 4263 (clay) -1598 (untouched fields) =2665m³/hour of runoff.

This additional huge volume of water running off the site could have a significant effect on flooding in the local area.

The table below is an illustration of how quickly rainfall will fill the lagoons – typical examples of historic rainfall on the site are in blue.

The table 1 illustrates how quickly the lagoon will fill up, for example in the event of heavy rain all day it will fill up in 6 hours. During a 1 in 100 year storm event (orange) it will fill up in less than an hour. Note that weather for this year touched 50mm last month (August 2020)

Average rainfall and storm water on quarry site

Metric area of Site m ²	Rainfall in mm/hour on site based on figures from EA re surface water runoff*	Actual local rainfall in mm/day taken from historic records	Volume of rainfall on site in cubic metres	Adjusted for 80% runoff clay top	To fill upper lagoon @1m in days or hours. Potential to breach lagoon	Conditions
53.4ha= 532,900m²	R/h	R/d	730x730xR/d	X0.8	145x178x1 = 25,810m³	
		2.5mm/d	1332m ³ /d	1065m ³ /d	24 days	Normal rain
		6.00mm/d	3197m ³ /d	2557m ³ /d	10 days	Heavy
		10.00mm/d	5,329m ³ /d	4263m ³ /d	6 days	heavy rain all day
			730x730xR/h			
	48.89mm/h		26,053m ³ /h	20842m ³ /h	>1hour	1%AEP storm
	68.45mm/h		36,477m ³ /h	29181m ³ /h	<1hour	Adjusted for future climate change

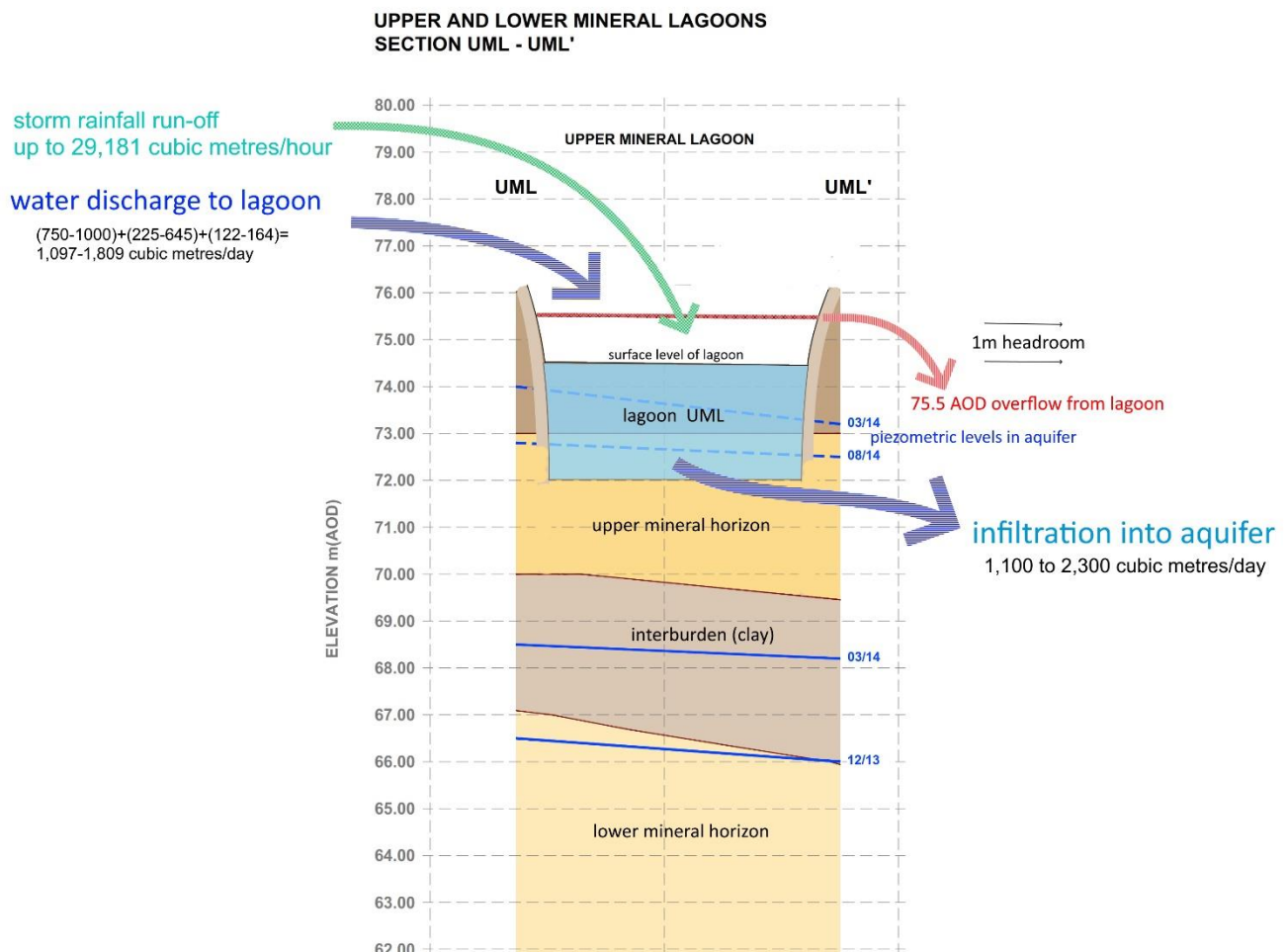
table 1

Surface Water Runoff

“This was presented in the environmental statement that accompanied the planning application. A 1% AEP 1-hour storm duration results in a rainfall intensity of **48.89mm/hr***, or **68.45mm/hr*** inclusive of climate change. A conservative approach was adopted that assumed all rainfall onto the proposed extraction and processing areas will result in surface water runoff. Over the proposed extraction works area of 53.4ha, 36,550m³ of surface water runoff will potentially result from the restored phase”.

Brett Aggregates Limited
Hatfield Road Quarry
Groundwater and Water Management Plan. Final V.5

A cross section of the upper mineral lagoon:



Inflowing: 1,097 to 1,809 cubic metres/day (workings). Recharge: 1,100 to 2,300 m³/day (aquifer)
+ Inflowing extra rainfall: 20,842 m³/hour (1%AEP storm). Now breach lagoon 1m rim and flood.

The above diagram shows the cross section of the upper lagoon. In normal operation the discharge to it equals the infiltration leaving it (blue). Extra storm water (green) from rainfall run-off is also added to the lagoon. If this extra amount fills above the 1 metre headroom in a short space of time, then the lagoon will overflow as shown in red.

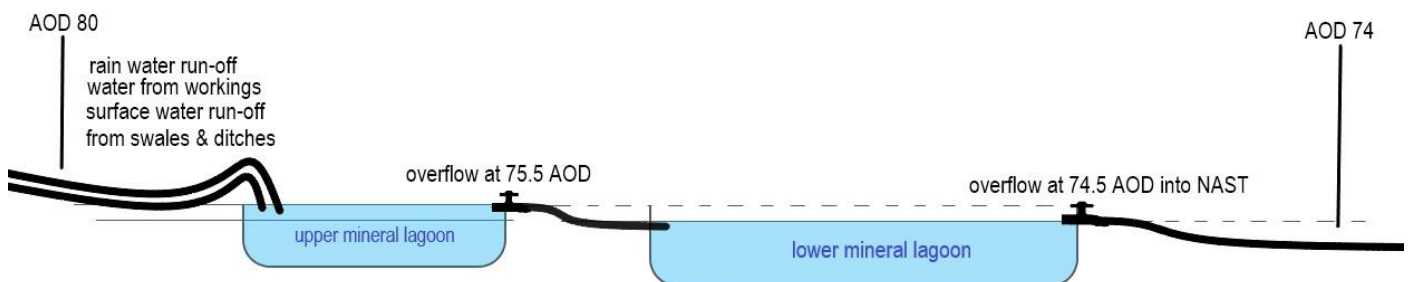
The consequence of the lagoons exceeding their discharge rate is that SuDs drainage system will fail, this will allow surface water on the site to travel downstream towards the lowest river system, in this case the Ellenbrook and the Nast.

During a weather event the rivers will have to take extra water capacity – they are already designated a flood risk – the direct result is that we will see flooding in our urban areas.

Once the Lagoon reaches full capacity, the surface water can no longer be pumped into the lagoons and will find its own way along the less permeable surface and run off increasing the risk of surface water flooding

In the event that the lagoons overflow EARA are very concerned how this may impact the flow of water into the NAST brook. There is a lack of clarity how overflow between the lagoons will work and we would like assurance that excess water will not be dumped into the Nast and therefore cause flooding in the Ellenbrook area. The following diagram illustrates how the lagoons may overflow.

A conceptual view of breaching of the lagoons into the NAST brook



A connection (overflow 74.5 AOD) to the Nast brook (shown in earlier diagrams)

The above diagram also shows the potential for cross contamination of the two groundwater systems. In the event of a flash flood then lagoon UML would breach into lagoon LML, contaminating waterways downstream of the site with possible bromate laden water.

EA:

“We also support the arrangements presented in Section 2.2.2 that the Lower Mineral Horizon will only be pumped in small areas within each phase following consultation with key stakeholders and the approval of Brett Aggregates Managing Director and provided there is capacity in the Lower Mineral Lagoon, and that water levels in the Upper Mineral Lagoon remain 1 metre or more higher than water levels in the Lower Mineral Lagoon.

We welcome the changes that have been made to Section 2.3 Infiltration Lagoons to clarify which water will flow into which lagoon and to emphasise the importance of segregating waters from the upper and lower mineral horizons.”

NE/2018/128672/02-L01 3rd January 2019

In summary

- Climate change. This is not taken into account by EA. They are using pre 2016 data when calculating the risk factor for the quarry application.
 - Climate change poses a real threat to flooding in our area, with extreme events occurring much more regularly than predicted
 - The Ellenbrook area has recently (August 2020) been the subject of a flood risk warning highlighting this real risk to the area from flooding.
- Increased rainfall run-off is a direct result of quarrying on an open plan site. Defoliate from grass/brush to clay increases the run-off by 50%.
- Geographic location. The proposed site is above Ellenbrook and parts of the university in terms of metres above sea level. The quarry site is up to 80 AOD, and flooding is shown to occur at 73 AOD – the A1057 roundabout and along the Ellenbrook river, and housing.
- Too close. We are in a vulnerable position too close to the lagoons.
 - The closeness of the Brett lagoons to urban properties has not been taken into consideration. Only 350m separate the University, roads, and housing, the quarry is too close and poses a significant risk to them.
 - These lagoons are man - made and subject to accidents, overflow, and blocking due to silt & algae.
 - They are extremely deep, and our estimates carry 350,000 cubic metres of water.
- Changing hydrogeological regime. Construction of the lagoons in such a way diverts the natural underground aquifers into a concentrated plume. This impacts on water receptors and structures in its path.
- Flood plain. The EA state that the development is in Flood Zone 1, but do not mention that the area south of the quarry is in Flood Zone 3, so any additional run-off water will have consequences for the residential, commercial and educational establishments surrounding the site
- Lagoons overloading
The consequence of the lagoon overflowing the 1 metre headroom will be that no more excess water can be removed from the site by the Sustainable Drainage System (SuDS) method. The result is that surface water run-off, over impervious surface, will now travel towards the river systems; exceedance to Nast brook or Ellenbrook will cause extensive flooding to housing, university, A1057 road and A1M.

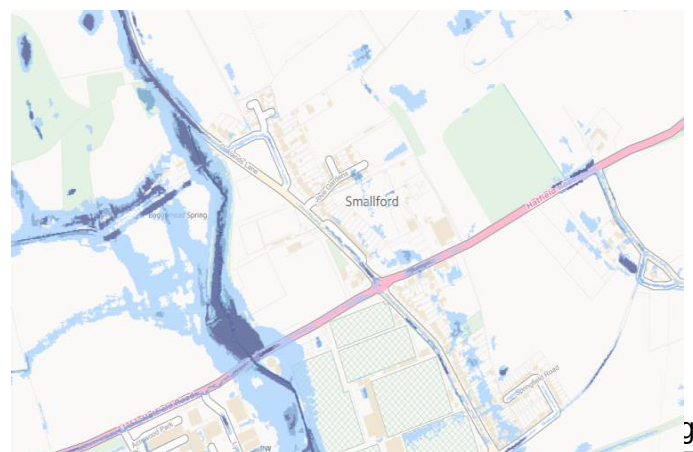
The area around the quarry is already at risk from river and surface water flooding as demonstrated on the EA maps below.

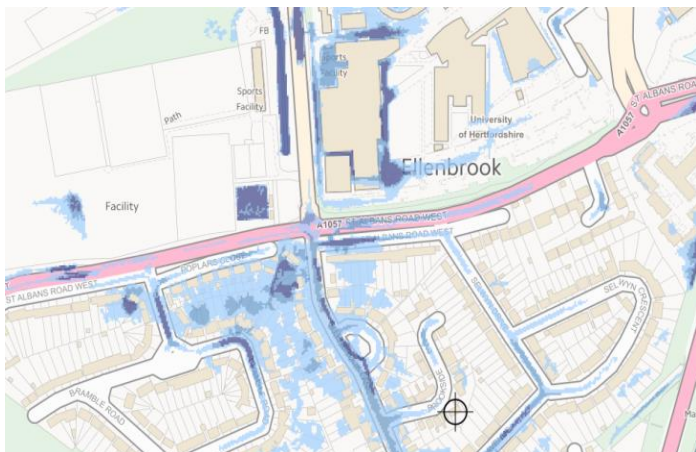
Environment Agency Maps – High Risk areas shown in **Dark Blue** – Medium in **Light Blue**

Surface Water flood zones

Ellenbrook, Hatfield and the University
to the South East of the quarry

Smallford, St Albans
to the South West of the quarry

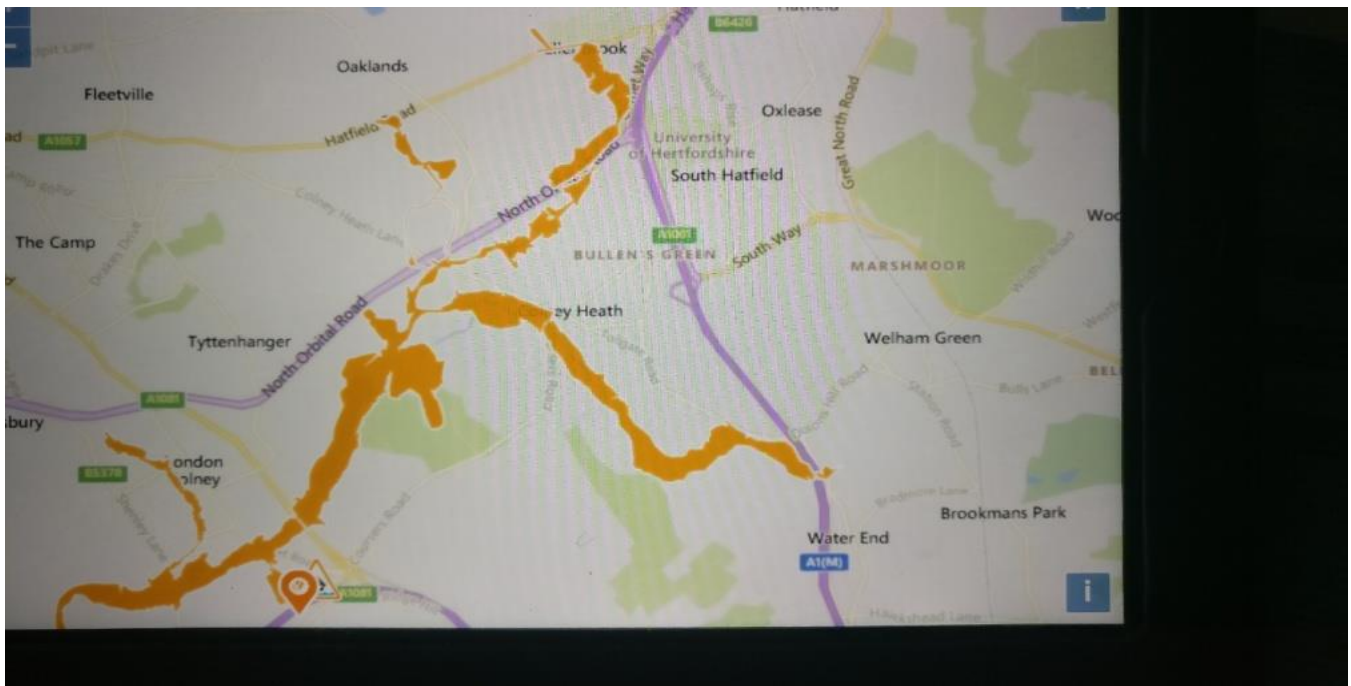




River Flood Risk – Immediately South of the proposed quarry site



Environment Agency Flood Alert 28th August 2020



We ask on behalf of the residents of Ellenbrook, Smallford, Salisbury Village and surrounding area that the HCC Planning department reconsult with the EA and LLFA to give them an opportunity to reconsider their recommendations and ensure our area is protected from both river and surface water flooding and that the decision makers on the DCC are given this report and allowed to reject this quarry application on the grounds of the unacceptable risks this poses to the local community.