

Shardeloes Lake investigation

We have produced this report in response to the discolouration of Shardeloes Lake that members of the public first reported to us on 29 May 2020.

The initial determination of the Environment Officer who received the incident report was that precipitation had occurred due to natural occurrences. However members of the public suggested that that the discolouration was a direct result of HS2 activity in the area. Acknowledging the public interest we asked HS2 and the HS2 contractor Align to carry out an investigation into the matter. At the same time we carried out our own investigation.

HS2's investigation concluded that it was unlikely that the drilling activity caused or contributed to the discolouration. This was largely due to the fact that there was no drilling around the time of the events and that there was significant distance between the lake and where they had been drilling.

The further barrier between the Lake water column and the underlying aquifer created by years of sedimentation, also further reduced the likelihood that the borehole activity would have caused the discolouration seen. This all provides a low probability that the incident was a result of HS2 activity. Our Technical Officers in our Groundwater and Land Quality team supported the conclusions from HS2 contractor Align.

For our investigation we looked at all potential sources of the discolouration. After reviewing the information available surrounding these incidents our conclusion is based on the balance of probabilities. Our investigation indicated a very strong likelihood that the discolouration witnessed in Shardeloes Lake was a result of Calcium Carbonate in suspension within the water column. Sample results and YSI field test results both show an elevated pH which, combined with the chalk stream nature of the feeding watercourse, would give rise to the logical assessment that this discolouration was Calcium carbonate turbidity.

The weather conditions at the time provided the right conditions for algal blooms to occur, which increases the chance of a whiting event. Our field testing results show supersaturation of oxygen. This suggests there was no sediment pollution event causing an oxygen demand, as dissolved oxygen levels for a sediment pollution event would typically be below 100%. Our tests also showed increased pH in the water column, which, combined with the supersaturation of oxygen, indicates an algal bloom. The lack of indication of other pollution events, combined with the visual inspections of experienced Environment Agency Officers shift the likelihood towards an algal bloom.

Weighing up all these factors our conclusion at this time is that the incidents of discolouration in Shardeloes Lake have most likely been caused by the natural occurrence of an algal bloom inducing the whiting event (Precipitation of Calcium Carbonate).

We also concluded that there is a low probability that HS2 borehole activity caused the incident. However it is not possible to rule out HS2 involvement, nor is it possible to say definitively that the precipitation is as a result of algal activity.

However, based on our field visits and water quality readings we consider the risks to the environment to be low impact. This impact can be identified as a risk to the benthic ecology (organisms living on or in the bottom of a body of water) due to sedimentation, this risk however is reduced for fish spawning due to the time of year. Also the short time

period in which the lake experienced higher turbidity would reduce the risk of changing the benthic ecology long-term.

We have now received reports of the discolouration at Shardeloes Lake on 3 separate occasions. We have sent officers to site every time. On each occasion our Officers were unable to see signs of a significant pollution event and recorded favourable water quality readings (of particular note the oxygen appeared super saturated on each visit). For a sediment pollution we would expect to see a drop in Oxygen saturation and so the similar conditions provide further support for the initial assessment.

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