

jane.curley@staffs Moorlands.gov.uk

For the attention of: Jane Curley

Dear Jane,

Your Ref:

Our Ref: 418058

Planning Ref: SMD/2019/0646

Date: 8th April 2021

Q3- Moneystone Quarry - Safety and Stability Statement

This statement has been prepared by Abbeydale BEC to respond to concerns raised on application ref: SMD/2019/0646 in relation to the safety and stability of Quarry 3 including technical comment on a select number of objections made by what appear to be a small group of local residents who are opposed to this project and indeed appear to find proposals for any form of development in the area unacceptable. The objectors have identified a number of issues relating to the safety and stability of Quarry 3, both technical and contractual, that would be relevant considerations, if the assumptions raised in the objections were technically correct.

Referenced Objections:-

- Jarrod Ford JF - 29 August 2020
- David Walters DW - 16 November 2020
- David Walters DW. - 5 January 2021
- John Williams JW. - 18 January 2021
- Sheila Walters SW - 28 January 2021

Paragraph 178 of the National Planning Policy Framework (NPPF) (2019) states that:

“Planning policies and decisions should ensure that: a) a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation).” A number of detailed technical assessments were carried out by Abbeydale BEC in relation to the stability of the quarry to support the outline planning application. The 2013/14 and previous 2011 ABEC reports which formed part of the outline planning application included a series of slope stability assessments. Additional stability assessments were also undertaken within the November 2018 ABEC report 418055SI, Appendix B and further summarized in Sections 9.5.3 and 9.5.4 of the report (See attached).

The analysis assessed the stability of the slopes during the various phases of groundwater rise, proposed earthworks and development. The conclusion was that a

rock rubble slope should be placed along the north side of Q3 along its western and central section underwater to maintain the designed 30% improvement in stability. The analysis also showed that maintaining a stable lake level below the existing 155 to 157m AOD bench would assist in maintaining the stability of the remaining slopes. These measures to ensure the stability and safety of Quarry 3 have been included in the Phase 1 earthworks submitted in support of the reserved matters planning application (Table E3 Earthworks Sequence) and will be delivered as part of the proposed development. The Geotechnical and Geo-Environmental assessments undertaken by Abbeydale on behalf of Laver Leisure, whilst dating back to the initial desk studies in 2011 (418040DS dated March 2011), have been re-evaluated and presented for the planning application in our Overview Site Investigation Report 418055SI, dated October 2018 where all previous reports are cross-referenced. These are taken as read.

In relation to the specific objections received, we note that the vast majority of the development proposed in Quarry 1 appears not to concern the selected objectors. The objections only appear to raise concerns about the side slopes and hydrology contained within a relatively small area of Quarry 3 i.e., not the application site as a whole. To limit repetition we will not go through each point, as raised by each objector, but group them under the following four headings which are then discussed in further detail.

	Topics	JF	DW	DW	JW	SW
1	Weak Sandstone Bedrock	X		X	X	
2	Stability of Side Slopes	X		X		X
3	Lack of Hydrological Knowledge		X	X		X
4	Quarry Safety Reporting		X	X		X

1. Weak Sandstone Bedrock

The objectors who refer to ‘weak rock’ appear have a fundamental misconception about the term “Weak Sandstone”. JF correctly defines the description using BS 5930, and even gives it a UCS strength range of 0.6 to 1MPa (600 to 1,000kN/m²). However, a stiff soil or very stiff soil, which is capable of holding up a house, have UCS values of 150 to 300kN/m² and 300 to 600kN/m² respectively. Therefore, whilst a weak rock is obviously weaker than a strong rock, a weak rock is significantly stronger than a very stiff soil.

Picking up on our own initial opinions in our 2011 report, issues related to 'disintegration during saturation' are raised. It was for this reason that we investigated, in 2015, the strength of the sandstone where it had been previously saturated. As discussed in our 2018 Overview Report, Section 6C, some of the previously submerged sandstone sampled was found to be weak (10MPa), whilst those exposed above lake level were found to be stronger than the more typical 6 to 34MPa strengths found in the cored samples. It was concluded from these findings that strength loss was not as critical as possible theoretical previous values and a worst-case mass strength of 10MPa could be used in stability modelling for the project in this area of Quarry 3.

2. Stability of Q3 Side Slopes

As has been highlighted by a number of the objectors, when we first reported in 2011 we expressed our view that with Q3 floor being allowed to flood, consideration should be given to the **theoretical** possibility of a mass collapse of the north face, affecting Eaves Lane, which is a prudent approach. However, it should be pointed out that this was solely based on the evidence provided by the historic operators of the quarry, and predated our own technical investigations and assessments. Since expressing these concerns Abbeydale BEC have had the benefit of over ten years of monitoring and ground investigation work as presented in our 2018 418055GR Report. Therefore, using a more detailed, evidence based assessment on the quarry slopes, safe solutions were presented in our Overview Report. These included multiple assessments with lake water levels of 153, 154 and 156m AOD, which at the time were being considered.

The conclusion of our reports are clear; there are no instability issues, and therefore there is absolutely no prospect of a Norway style landslip, or a Tsunami, the possibility for which has been inaccurately raised by the objectors. The proposed development includes substantial earthworks to improve the stability of the slopes and control the lake at an agreed level.

3. Lack of Hydrological Knowledge

I suspect there will not be many other development projects of this scale in the country that can boast over 25 years of groundwater monitoring data and assessment. Most regulators are acceptant of 6 to 12 sets of readings over a 6 week period. However, with QRA requirements quarry records were available and our own involvement has continued the monitoring with reporting on a quarterly and biennial basis. The evidence base in this respect is therefore extremely sound.

4. Safety & QRA Validation

Safety is paramount in all phases of work. Whilst Sibelco was responsible for the Quarry Regulations Act (QRA) validation during the quarry's life we have a longstanding instruction from Laver Leisure to continue recording the state of the geotechnical and environmental aspects of the quarry during its restoration phase on a quarterly and biennial basis. To date no geotechnical issues or questions of concern by regulators have been raised.

We trust that the above addresses concerns regarding the safety and stability of Quarry 3, but please do not hesitate to ask if further clarity is required.

Yours Sincerely

PJ Lloyd

Peter Lloyd