



Local Geological Site Proposal Form

To be submitted to panel meeting convenor

Site Name	Kendal End Quarry	
Grid Reference	SP 0014 7467	
Landowner	Birmingham City Council	
Site Surveyor(s)/Proposer(s)	Alan Richardson	
Boundary Map included?	Yes	
Date proposed	06.03.22	
Panel decision	Date	Decision

(status determined using standard condition monitoring form or NE reports in case of SSSI)

Summary paragraph

The north-south ridge of the Lickey Hills is a unique inlier of Ordovician rocks protruding upwards through the surrounding younger formations. Located on the southern slope of Cofton Hill, the Kendal End Quarry (KEQ) exposes structural and sedimentary features not seen elsewhere in the Lickey Quartzite Formation (LQF). The maximum height of the quarry face is less than 2.5m, so it is safe venue for teaching purposes.

The Lickey Quartzite in Barnt Green Road Quarry (BGRQ) LGS, 650m to the north of KEQ, exposes Lickey Quartzite that is believed to be the lowest exposed rock in the LQF. It is a relatively immature sub-arkose, with an abundance of clay bands and micaceous horizons. By comparison, the rock in the KEQ contains very little feldspar and fewer clay bands, suggesting it is higher in the sequence.

Whereas faulting in the Barnt Green Road, Warren Lane and Rose Hill Quarries is strongly influenced by the presence of the clay bands, such effects are not so readily apparent in the KEQ.

The ridge of the Lickey Hills has been interpreted by some as the geomorphological expression of an underlying anticlinal structure in the LQF. The overall structure is likely to be much more complicated than this, however, the rocks exposed in the KEQ dip north eastwards, contrasting with the westward dip of the beds in the nearest exposure on the western side of Cofton Hill. It suggests that the southern section of the LQF may have an anticlinal structure. However, it should be noted that this appears to be contradicted by the dips of bedding seen in the BGRQ, where rocks with a similar orientation are faulted against a recumbent fold.

In addition to the differences in lithologies and sequence, the rocks here exhibit sedimentary structures not seen elsewhere in the formation. The wave-length of the ripples is so large that they are not immediately obvious, and easily overlooked. This hummocky bedding is consistent with storm wave activity, and provides evidence of changes in the processes acting in the environment of deposition.

Designation Criteria

Scientific

The orientation of the bedding in the quarry gives the clearest evidence of the eastern limb of a possible anticlinal structure underlying (at least) the southern Lickey Hills. More importantly, this outcrop may be critical in interpreting the complex structure of the rocks in the BGRQ. The sedimentary structures are distinctly different from those seen at other exposures of the LQF. Way-up criteria are elusive in the LQF, but future work at this site needs to prioritise identifying the younging direction in order to establish the relationship between these rocks and those in BGRQ. The sedimentary structures themselves provide a unique source of evidence for the depositional history of the sediments of the LQF.

Educational

A low continuous outcrop provides an excellent environment in which to introduce teaching groups to the basics of recording bedding, joints and faults by means of strike and dip measurements, and field sketching. An entire group can simultaneously access the rock face safely. For casual interest groups, the quarry provides a relatively uncomplicated view of the subsurface, which can be explained in simple terms.

Historical

Rock was extracted from the quarries of the Lickey Hills during a period of major improvement of the nation's road network, but ceased production in the late 1920s. They have remained largely undisturbed since that time.

Aesthetic

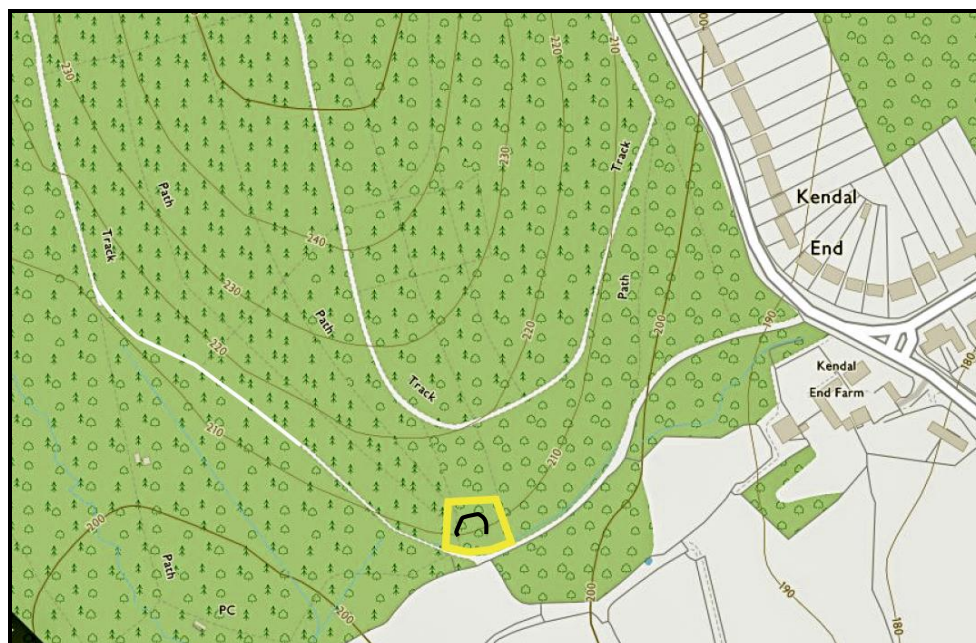
KEQ is a pleasing little quarry: the quarry faces are even, and are well-maintained by the Lickey Hills Geo-Champions with the support of the Country Park Rangers.

Site Description

a) Boundary map



Map of Cofton Hill – the yellow rectangle highlights the area of enlargement below.



The black line is the quarry face, the site boundary is outlined in yellow. It lies close to the southern boundary of the country park.

b) Access & site management - Access to the quarry is unrestricted: a few wooden steps lead to it from the footpath, from which it is screened by undergrowth. The site is conserved by the Lickey Hills Geo-Champions in association with the Birmingham City Park Rangers.

c) Nature of site - A small quarry with a single 2.5m high face.

d) Geological units or landscape features present - The quarries expose Ordovician



A panoramic view of the Kendal End Quarry. The bedding is seen to dip from right to left (NE), and is cut by three faults (and a possible fourth) indicated by dashed yellow lines.

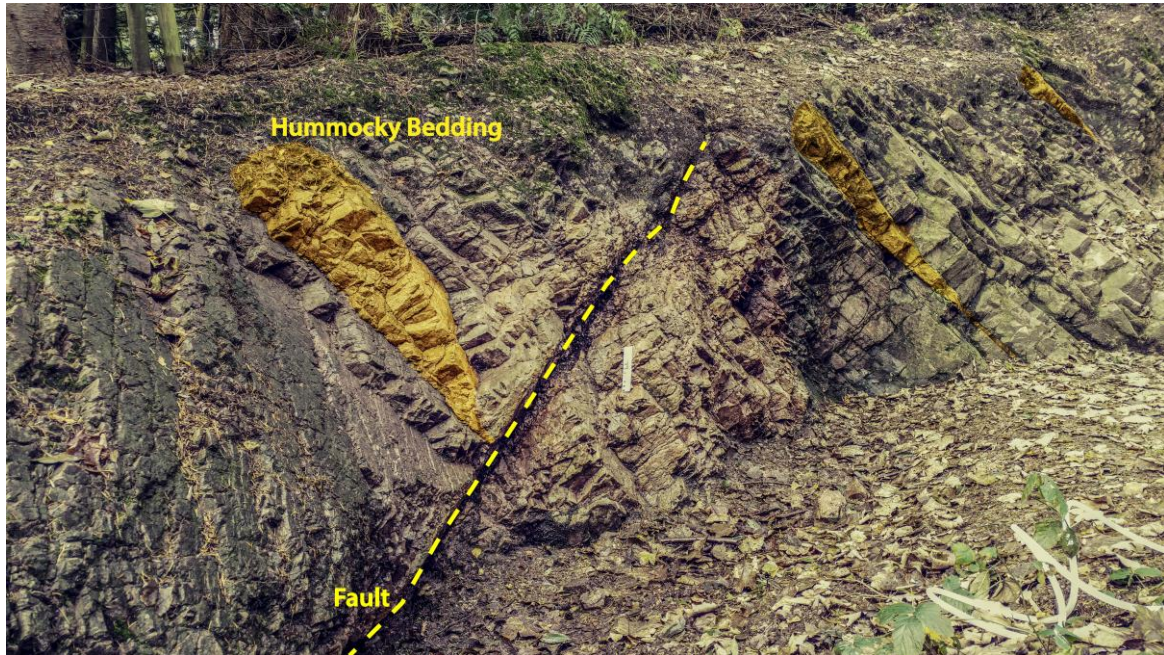


Enlargement of the left side of the panorama.

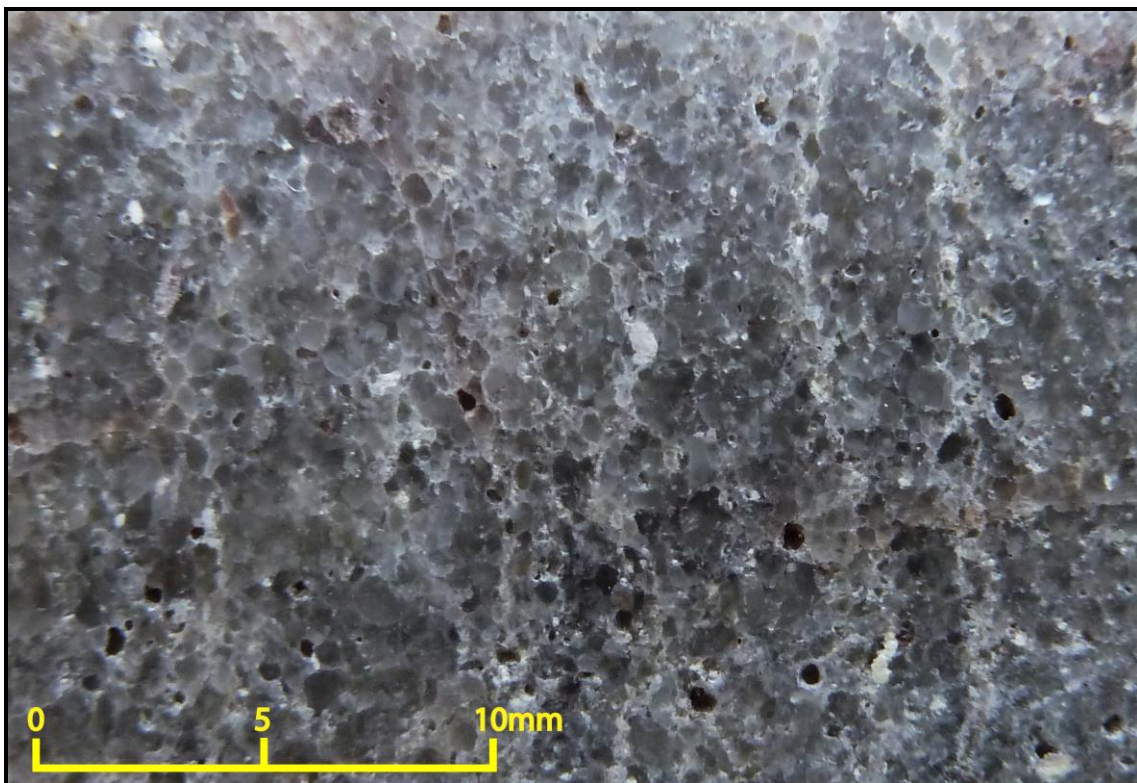


Enlargement of the right side of the panorama. The hollow on the right may be the site of a fourth fault.

Lickey Quartzite Formation arenites and clays. The 'quartzite' is strongly-cemented and heavily jointed.



Beds exemplifying hummocky bedding have been tinted yellow. The younging direction remains to be established: if the beds have been inverted the highlighted hummocks will turn out to be troughs. The well-defined fault at the west side of the quarry has been indicated by a dashed line. The scale rule in the centre of the picture is 20cm.



Polished surface of Lickey Quartzite in KEQ. It is a well-sorted, mature quartz arenite.

- e) **How this site complements existing sites** – The rocks in this quarry appear to be in structural continuity with those on the extreme east side of BGRQ. When compared to the nearby outcrop, a few hundred metres to the north, the rocks here appear to be the eastern limb of an anticline.

Site Condition

Good. The rock faces are stable, and fully accessible, making them easy to maintain. Sections have been cleaned by pressure washing, with more extensive cleaning planned by the Lickey Hills Geo-Champions in collaboration with the Country Park Rangers.

Why is the site at least regionally important?

Appreciation of nature	The quarry is set in mature woodland in the Lickey Hills Country Park. The quarry provides a slice through the natural layering of the environment, allowing visitors to see the relationship between rock, soil and vegetation.
Connectivity with landscape	The hard, resistant rock of the LQF contrasts with the softer Triassic sediments seen nearby, and accounts for the relief of the Lickey Hills ridge.
Diversity	The Ordovician Lickey Quartzite Formation is only exposed in the Lickey Hills and therefore makes a unique contribution to the variety of geology to be seen in the county. This site is the southern-most exposure of the LQF, and is the only one in which hummocky bedding has been identified.
Education	The quarry is easily accessed and provides a safe learning environment. It is regularly maintained by the Lickey Hills Geo-Champions, and is used by them to introduce guided groups to the geology of the Lickey Hills.
Historical associations	No references to this site have been found.
Naturalness	The site has remained largely undisturbed since quarrying ceased in the early 20 th century.
Rarity	The hummocky bedding has not been identified elsewhere in the LQF. The orientation of the strike and dip of the bedding is consistent with only one other location, to the east of the 'step-over fault' in BGRQ. These appear to be the only two remaining exposures in the southern half of the Lickey Hills that illustrate the eastern limb of the supposed anticline, and both are essential to establishing the extent of this structural unit.
Typicalness	The lithologies and sequence appear consistent with the upper LQF.
Cultural associations	The Lickey Hills Quarries provided road stone in the early 20th century, but were abandoned in the 1920s.
Fragility	The site is stable, but requires the continued efforts of the Lickey Hills Geo-Champions, alongside the Country Park Rangers, to maintain visibility and accessibility.

References

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