Birmingham & Black Country Local Sites Assessment Report

EcoRecord Reference	Site Name	Grid Reference	Current Status [1]	Survey Date(s)
	Eachway Lane Worm Burrows	SO 995765 w3w – dine.alert.mull		12.03.19 18.04.19
Planning Authority	**Site Ownership**	**Area/Length**	**Reason for Survey**	**Report Date**
BCC	BCC	10m^2	Research	09.03.23

Meets LS Criteria		Type	Geological	i.e. Wildlife/Geological

Amendment(s)	New Site	i.e. None; New Site; Upgrade; Downgrade; Extension; Whole/Part Deletion
Description	An exposed bedding plane in Lickey Quartzite exhibiting trace fossils of worm burrows overlain by a possible bentonite.	

Citation (Summary of Value)

With the exception of a single Cruziana (trilobite feeding trail) in Warren Lane Quarry, this bedding plane bears the only known evidence of biological activity found in the Ordovician Lickey Quartzite Formation (LQF). The site was only (re-) discovered in 2019 by the author.

Geological			
Intrinsic	**Palaeontology**	**H**	Trace fossils: worm burrows – possibly Diplocraterion.
	Stratigraphy	**M**	Ordovician Lickey Quartzite Formation (LQF).
	Structure	**M**	Steeply-dipping beds exhibiting many joint sets, some of which show evidence of minor movement, and are likely to be related to the flexural slip folding of the LQF.
	Physiography & Geomorphology	**L**	The exposure lies close to the break in slope which marks the base of the west side of the Lickey Hills ridge.
Rarity		**H**	Unique within the LQF.
Ass. with Other Sites		**H**	This is one of a network of sites across the Lickey Hills (some of which lie within Worcestershire). Most lie within the Lickey Hills Country Park. This one provides unique evidence of the environment of deposition of the sediments of the LQF.
Social			
Historical & Cultural		**L**	As a location for recreational activities, the Lickey Hills have always been a popular destination for the people of Birmingham. Faced with the threat of housing development in the nineteenth century, Rednal Hill was secured as a place for public recreation by Mr T Grosvenor Lee, who raised the money through public subscription. The plots into which the hill had been divided were handed over to the city's Baths and Parks Committee in 1888 and 1889. The area is dotted with quarries from which the Lickey quartzite was extracted for use in road building. The last of these closed down in the 1935.
Access		**H**	Within the Lickey Hills Country Park – unrestricted public access.
Aesthetic		**L**	
Recorded History		**L**	Mention of this exposure comes in a passing reference in a paper by Prof. C. Lapworth: "No fossils, except worm-burrows, have yet been detected in this Lickey Quartzite". (Proc. Geol. Assn.1898 p351) However, no indication of the location was given.
Value for Learning		**M**	The trace fossils provide a valuable example that proves the rule, "absence of evidence is not evidence of absence". Clearly life was present in the environment, but it has rarely been preserved. The joint sets may be of interest in the context of strain patterns in flexural slip folding.

Site Description

The small west-facing exposure lies within the long-abandoned and overgrown Eachway Lane Quarry, a few metres from the tarmacked section of the Drovers' Way that branches off from Eachway Lane to head south along the western edge of the Lickey Hills ridge. A rough footpath leads up to the exposure through low undergrowth.

Geology	
Solid/Drift Formation	Ordovician Lickey Quartzite Formation.
Description	**Lickey Quartzite 485-444Ma* [Ordovician]** *The Lickey Quartzite crops out as the north-north-west trending inlier of the Lickey Hills, between Kendal End [SP 001 746] and Holly Hill [SO 991 784]. It is a hard, brittle, jointed and very shattered rock, forming several low, steep-sided hills that are covered with a wash of quartzite chips and which support sparse vegetation. The inlier seems to be fault bounded on all sides, except at Rubery where the Lickey Quartzite is overlain unconformably by the Rubery Sandstone or the Halesowen Formation. Elsewhere, its stratigraphical relationships are unclear and no confident estimate of its thickness can be given. Tuffaceous material occurs most commonly in what are probably the oldest beds exposed, and there may be an upwards passage from the Barnt Green Volcanics (Lapworth 1899). The structure of the Lickey Hills is complex locally, and with very variable dips, but in general an anticline trends parallel to the bounding faults of the inlier and plunges gently to the north-north-west. The steepest dips and overfolding occur mainly along the edges of the inlier and may relate to later movements along the bounding faults.* *There is no clear relationship between the degree of sorting or the maturity of the sediments and their stratigraphic position in the Lickey Quartzite. The sorting, grain shape and sedimentary structures of the rock suggest deposition in a high-energy marine environment. Primary grain boundaries are still discernible and pressure welding is uncommon, suggesting early silica cementation. The presence of secondary chlorite, sericite and rare authigenic epidote indicates very low grade regional metamorphism.* *Strata low in the sequence, exposed in a quarry [SP 001 753]* ***[Barnt Green Road Quarry]*** *opposite Reservoir Road, Cofton Hill, comprise pale grey, brown and purple, flaggy, immature to submature quartzites in beds up to 0.6m thick, interbedded with purple sand and micaceous shales. The colour of the quartzite is caused by finely-disseminated, feldspathic, tuffaceous debris, and the shales are largely composed of the same material. This quarry exposes a synclinal overfold, with the beds folded about a near-horizontal axial plane (Plate 2) (Boulton, 1928, diagram p.256).* *Ascending the sequence, the Lickey Quartzite becomes paler and incorporates less tuffaceous material. In the largest quarry, in Rednal Gorge [998 759], massive beds of dark purplish quartzite, each up to 1m thick, are separated by yellowish green and deep purple, sandy clay partings. At the disused Leach Green Quarry (995 769] and at the Bristol Road south cutting [SO 992 774], the Lickey Quartzite varies from fine-grained and white, to coarse, grey and pebbly, and is in massive beds up to about 1m thick, which were lithified and jointed before the transgression of the Llandovery sea, because sands of Llandovery age have infiltrated down cracks. The formation here is cut by a very weathered dyke, which is truncated by, and thus older than Llandovery strata.* (BGS - Redditch. Memoir for Sheet E183: Old, R.A. 1991) With the exception of this exposure, and a single Cruziana in Warren Lane Quarry, the LQF appears devoid of evidence of biological activity. Clearly, this does not reflect a poorly-populated environment. On the contrary, well-oxygenated environments support scavengers which remove potential body fossils, while the high-energy tidal marine environment, in which these deposits accumulated, constantly reworked the sediments, destroying any potential trace fossils. The single bedding plane that exhibits the trace fossils is immediately overlain by a poorly-cemented sandy clay. The author believes this to be a bentonite resulting from ash fall from a volcanic eruption. This would account for the preservation of the burrows, as the ash would have smothered the organisms (preventing them from migrating upwards through the sediment), and would have had enough cohesion to prevent the reworking of the sediment itself.

Features of Value	
1	Worm Burrows – possibly Diplocraterion.
2	Sandy clay layer – possible bentonite.

Soils

Public Access & Site Usage	
Land Use	Public Open Space
Access Level	Open access
Access Type(s)	Rough informal path from nearby tarmacked lane.

Comparison with Previous Survey(s) Results

Summary of Assessment
This is a valuable site as it provides unique evidence of the Ordovician benthic fauna during the deposition of the Lickey Quartzite. It is easily accessible (via a short, steep, uneven path), stable and safe, and lies within the Lickey Hills Country Park. It is maintained by the Lickey Hills Geo-Champions and is documented in *The Lower Palaeozoic Geology of the Lickey Hills 2nd Ed.* (Richardson 2023)

Recommendations (including further survey & site management/enhancement)	
1	Continued regular site maintenance by the Lickey Hills Geo-Champions (H&WEHT), with support from the Lickey Hills Park Rangers.
2	Commission an analysis of the possible bentonite.

Data Sources		
	Source	**Date**
Species and Habitat Data Source(s)		
Geological Data Source(s)	• BGS, Geology of Britain Viewer; **https://mapapps.bgs.ac.uk/geologyofbritain/home.html** • BGS, Lexicon of Named Rock Units; **https://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=LQ** • Boulton, W.S. (1927) The Geology of the Northern part of the Lickey Hills, near Birmingham. *Geological Magazine*, Vol 65, Issue 6, 255-266 • Couples, G. D. et al. *Strain partitioning during flexural-slip folding*. Geol. Soc. London, Special Publications Vol. 127 pp. 149-165 • Eastwood, T., Whitehead, T.H., and Robertson, T. (1925). The geology of the country around Birmingham. *Memoir of the British Geological Survey of Great Britain*. NERC • Hardie, W.G. (1971) Lickey Hills*; G.A. Guide No.1 The Area around Birmingham* (2nd Ed.). The Geologists' Association. pp. 12-15 • Hardie, W.G. (1991) A Guide to the Rocks and Scenery of the Lickey Hills Area. The Lickey Hills Society, • Lapworth, C., (1898). Sketch of the geology of the Birmingham district, with special reference to the long excursion of 1898. *Proceedings of the Geologists' Association*, Vol 15, 313-415. • Old, R.A., Hamblin, R.J.O., Ambrose, K., and Warrington G. (1991). Geology of the country around Redditch. *Memoir of the British Geological Survey, Sheet 183*. NERC. • Richardson, A. S. (2023) The Lower Palaeozoic Geology of the Lickey Hills 2nd Ed. Richardson **https://ehtchampions.org.uk/ch/wp-content/uploads/pdfs/Lower%20Pal%20of%20Lickey%202nd%20Ed.pdf**	
Historic Data Sources(s)	Chinn, C. (2012) *Free Parks for the People*. Studley: Brewin.	
Assessment Author and Organisation	Alan Richardson, Herefordshire & Worcestershire Earth Heritage Trust.	

[1] Definitions of Local Sites in B&BC (SINCs & SLINCs) and Potential Sites of Importance (PSIs)

In Birmingham and the Black Country Local Wildlife and Geological Sites encompass what are termed Sites of Importance for Nature Conservation (**SINCs**) and Sites of Local Importance for Nature Conservation (**SLINCs**). This two-tier system aims to ensure that all sites of substantive local nature conservation and geological value are selected by assessing sites in both a sub-regional (i.e. Birmingham and the Black Country) and metropolitan borough or city context (either Birmingham, Dudley, Sandwell, Walsall or Wolverhampton). The two designations are defined as:

- Site of Importance for Nature Conservation (**SINC**) - Sites of substantive nature conservation value in the context of Birmingham and the Black Country.
- Site of Local Importance for Nature Conservation (**SLINC**) - Sites of substantive nature conservation value in the context of a metropolitan borough.

Potential Sites of Importance (**PSIs**) have not yet been assessed against the Local Wildlife and Geological Sites selection criteria but may potentially support species of note, areas of important semi-natural habitat or valuable geological features. PSIs are identified primarily through the use of aerial photography, but also through reference to old maps, existing records and local knowledge. Commonly these sites will not have been subject to the survey work necessary to undertake a Local Wildlife and Geological Sites assessment.

[2] Habitats/Species of Note Tables – Attribute Definitions

STATUTORY (PROTECTED) - ***EHD*** = EU Habitats Directive (plus where relevant the Annexe II or IV) | ***WCA S1*** = Wildlife & Countryside Act Schedule 1 (birds protected at all times) | ***WCA S5*** = Wildlife & Countryside Act Schedule 5 (animals with various levels of protection) | ***WCA S8*** = Wildlife & Countryside Act Schedule 8 (higher and lower plants with various levels of protection) | ***PBA*** = Protection of Badgers Act 1992 | ***HabRegs2*** = The Conservation (Natural Habitats, &c.) Regulations 2010 (Schedule 2) | ***HabRegs4*** = The Conservation (Natural Habitats, &c.) Regulations 2010 (Schedule 4).

NERC – ***Y*** = Habitats/Species included on the current list of Principal Importance in England under Section 41 of the NERC Act (2006 or amended).

LBAP – ***Y*** = Habitats/Species included on the latest B&BC LBAP list of Priority Habitats/Species.

RDL - Species included on Global IUCN & British Red Data Lists: ***BRed*** = Bird Population Status – red | ***BAmb*** = Bird Population Status - amber | ***RLGB.EN*** = IUCN (2001) – Endangered | ***RLGB.VU*** = IUCN (2001) – Vulnerable | ***RDBGB.R*** = IUCN (pre 1994) – Rare | ***RLGB.Lr(NT)*** = IUCN (2001) - Lower risk - near threatened | ***RDBGB.IK*** = RDB - Insufficient known | ***RLGB.DD*** = IUCN (2001) - Data Deficient

RARITY (HABITATS) - BIRMINGHAM & BLACK COUNTRY - ***Y*** = Habitats included on the B&BC list of locally rare habitats (administered by EcoRecord).

RARITY (FLORA SPECIES) - BIRMINGHAM & BLACK COUNTRY - (based on data held and managed by EcoRecord): ***VR*** = Very Rare - a species present in less than 1.0% of 1Km squares, tetrads, or 5Km squares in B&BC | ***R*** = Rare - a species present in 1.0% - 4.3% of 1Km squares, tetrads, or 5Km squares in B&BC | ***U*** = Uncommon - a species present in 4.3% - 12% of 1Km squares, tetrads or 5Km squares in B&BC | ***NRR =*** no recent B&BC records.

AXIOPHYTE - ***BBCF_Ax*** = included on the Birmingham & the Black Country list of axiophytes (administered by EcoRecord).

YEAR - The most recent year the species has been recorded.

[3] Species listed on Schedule 9 part 1 (animals) and part 2 (plants) of the Wildlife and Countryside Act 1981 as amended - this lists animals which may not be released or allowed to escape into the wild and plants which may not be planted or otherwise caused to grow in the wild.

Report Maps

Figure 1. Map of Rednal Hill showing the Worm Burrows Site (outlined in red), adjacent to the Drovers' Way.

Fig 2. EcoRecord locations of Rednal Hill Geological Sites.

Target Notes

Site Photographs

Figures 3 & 4. General views of the 'Worm Burrows Site' on the western flank of Rednal Hill.

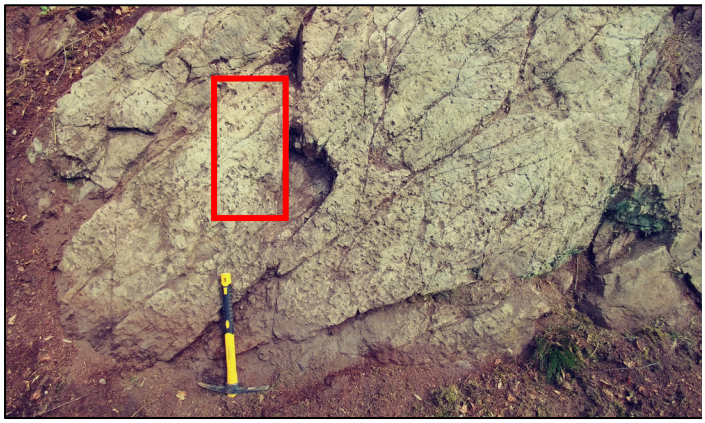

Figure 5. The single exposed bedding plane seen to exhibit worm burrows, showing the area of enlargement in Figure 5.

Figure 6. A Close-up of some of the burrows. While they appear to be grouped in pairs, this has not been confirmed by identifying any U-shaped structures within the bed.