

## Location MT4

SO 7383 6380

### Footpath-side exposure, NE of Shelsley Beauchamp

After leaving the track that passes Location MT3, the path becomes narrower. Location MT4 is a short distance up the footpath on the right hand side. It is very small exposure of rock under a tree. Treat it with care.

*the whole exposure*

*the top of the exposure*



Look closely at the rock exposure. Notice that there is a harder band of rock standing out, with softer rocks either side. DO NOT touch or excavate the rocks in any way, as they are fragile and must be left intact for others to study afterwards. Loose rock pieces on the ground that have

fallen from the rock exposure can be examined. Aim to find a piece of both the harder rock and the softer rock; if you cannot find either, look closely at the rock exposure.

The harder rock: is the rock made up of interlocking angular crystals or rounded grains?

It is made up of rounded grains. The rock is therefore sedimentary.

Using a ruler or grain size card, or the **grain size** tool in the app, find out what the grain size generally is.

What grain size category does this size fit into?

Is it silt / fine sand / coarse sand?

Is the rock well-sorted or poorly-sorted?

The rock is a reddish-brown colour, caused by a thin coating on the sedimentary grains of a mineral rich in iron. Choose from the following which this mineral is likely to be: calcite / haematite / olivine.

The grains making up most of this harder rock is quartz. Another mineral is common in the rock, forming distinct, very small, highly-reflective, plate-like particles. This mineral is likely to be: calcite / mica / haematite.

The softer rock: this rock is also sedimentary, but the grains making it up are mostly too fine to see in a hand specimen. This rock is therefore a:  
mudrock / sandstone / conglomerate.

The rock is soft because it has little cement in it, and it contains a lot of clay minerals, making it very slippery when wet. This rock is also stained with the same mineral as the hard band, and so has the same colour.

What type of bedding structures can you see in the harder rock?

We could call the appearance of the softer rock massive or structureless. What sort of processes could have created this appearance in the softer rock?

Most sedimentary rocks are laid down horizontally. These sedimentary rocks are not horizontal.

Measure the dip and strike of the rocks.

You could use the **compass-clinometer** in the app toolbox. If you cannot easily find and access a bedding surface to do this on, then estimate the dip and strike by getting as close as possible to the rock face and orientating your compass-clinometer to the same orientation as the dip and strike of the rocks here.

The strike of the rocks in this exposure is approximately: north-south / north east–south west / east-west.

The rocks are dipping towards the: west / east / south  
What angle of dip do you have?

Are there any obvious fossils in these sedimentary rocks?

*\* Using your answers to the above questions, decide which of the following (a) or (b) is likely to be true:*

(a) Water containing suspended fine-grained particles of silt and clay became still, allowing the particles to sink and accumulate on a surface below, forming a flat muddy sediment layer. The sediment was thoroughly bioturbated by organisms that have left no remains of themselves. The process was repeated, building up a thickness of structureless muddy sediment. At one time, this pattern was interrupted by faster-moving water, carrying coarser sandy particles, laying down some thin layers of sand, including small underwater dune structures. The sediments were gradually compacted, and the sands cemented to form rock. Later, the rocks were affected by tectonic forces, which tilted them to the orientation we see today.

(b) Water containing suspended fine-grained particles of silt and clay became still, allowing the particles to sink and accumulate on a surface below, forming a flat muddy sediment layer. These sediments were finely laminated and, as the water was stagnant with little oxygen in it, no organisms colonised the sediments, leaving their lamination structures intact. Following this, the area was affected by a nearby landslide, depositing a thick layer of coarse-grained angular debris on top of the muds below.

All these layers of sedimentary rocks have remained undisturbed ever since.

The environment the reddish-brown sedimentary rocks at this locality were formed in was (choose the most likely option):

a swamp / a river floodplain occasionally crossed by river channels / a coral reef.