GSIA

Gloucestershire Society for Industrial Archaeology

Cotswold Canals Restoration

Phase 1b. Saul Junction to The Ocean, Stonehouse

Project S26

Geology of the Frome Valley between Wheatenhurst and Eastington

by Penny Fernando April 2007 Issue 1

This is a review of the geology of the section of the canal where a new line is likely is to be needed near the A38 Gloucester to Bristol road. It includes a simplified geological map of the area.

Geology of the Frome Valley between Wheatenhurst and Eastington.

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April 2007

The OS map underlying the 1:50 000 Geological Survey sheet 234 dates from 1963 and shows the route of the Stroudwater Canal before the M5 and A419 link road were constructed.

The floor of the valley of the River Frome consists of Alluvial Deposits. The higher ground on either side is formed by gravel River Terraces (Pleistocene) and some areas of Lower Lias (Jurassic). Lower Lias clay underlies the whole area.

The original route of the Stroudwater Canal ran along the edge of the Alluvial Deposits until it climbed on to the gravel near Chipman's Platt (F). The new sections of the proposed routes lie wholly on the Alluvial Deposits of the valley floor.

Roman and Romano-British sites are known on the gravel terraces on both sides of the river. The wet, low-lying valley would presumably have been used for summer grazing so there is a possibility of chance finds when the new canal channel is dug.

The Cainscross Terrace (3) has yielded quite a lot of fossils and artefacts in the Stroud area. However, the Canal restoration will use the existing canal over the Cainscross Terrace near Chipman's Platt, so it is unlikely that there will be many new finds.
If the new channel goes down into the Lias clay Jurassic fossils will probably be found. These are common and are usually quite small, e.g. ammonites, bivalves and echinoids, although a plesiosaur was found during excavations for the gasworks in Stroud.

Unfortunately no Sheet Memoir has ever been published for geological sheet 234. I have not been able to determine the thickness of the alluvial deposits, nor whether they lie directly on Lower Lias clay, or whether the gravel continues across the valley underneath the alluviium. The stream / drainage channel south of the A419 has a gravel bed between X and Y and its southern bank appears to consist of silt about a metre deep, but this may be a modern feature associated with the construction of the A419 link road. I have not been able to examine the bed of the R. Frome.

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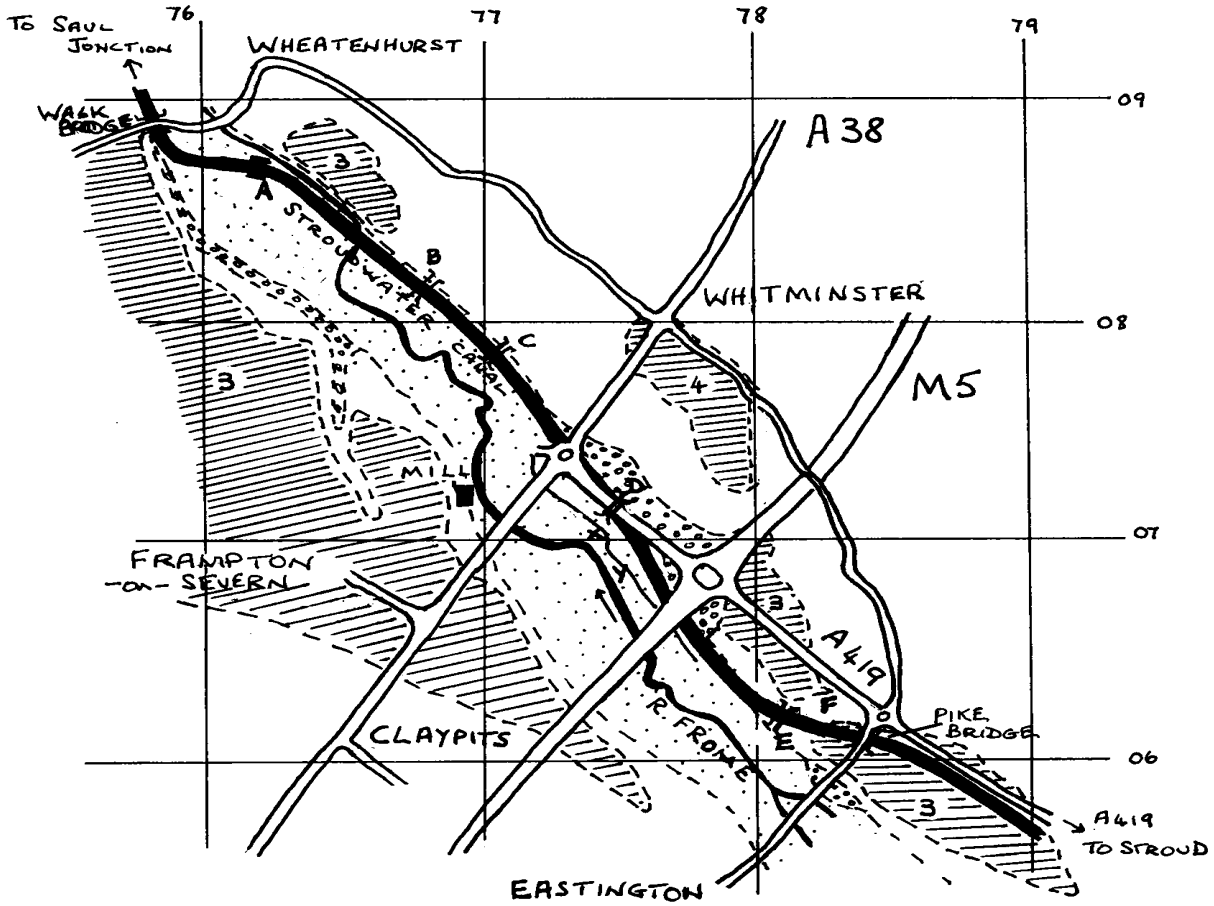
The original route of the Stroudwater Canal in relation to the Geology.

Sketch Map based on the 1:25 000 OS Explorer sheet 179 (Gloucester, Cheltenham and Stroud) and the British Geological Survey 1:50 000 map sheet 234 (Gloucester).



Key:

Gravel River Terraces
(numbers denote correlation with the terraces of the River Severn).
4. Whitminster Terrace (≡ the Kidderminster Terrace) c.120 000 y.a.
3. Cainscross Terrace (≡ the Main Severn Terrace) c. 25 000 y.a.

First Terrace (Higher Alluvium) c. 10 000– 13 000 years ago

Alluvium less than 10 000 years old

Lower Lias (mainly clay) Jurassic, c.170 – 180 million years ago

A	Whitminster Lock	B	Stonepits Bridge
C	Occupation Bridge	D	Hyde Bridge
E	Westfield Bridge	F	Chipman's Platt

Notes on the River Terraces and their Formation

The River Terraces are of the same geological age as the Severn valley river terraces. They were laid down from 175-10 thousand years ago at the end of the Ice Age when the sea level and the channel of the River Severn were much higher than today. The earliest terraces are those which are the highest above sea-level, which is the reverse of the usual sequence of geological strata. The Lower Lias which underlies the whole area is much older than the gravel terraces and the alluvial deposits, belonging to the Jurassic period 170 -180 million years ago.

The Frome River Terraces consist almost entirely of rolled Jurassic limestone fragments produced by weathering of the sides of the valley where the river passed through the Cotswold scarp, whereas the Severn Terraces contain pebbles formed mainly from the Triassic rocks found higher up the Severn Valley in the Midlands. The Whitminster Terrace (4)has been correlated in age to the Fourth (Kidderminster) Severn Terrace and the Cainscross Terrace (3) to the Third (Main) Terrace. The Stroud Terrace, which correlates with the Second (Worcester) Severn Terrace, is not exposed between Eastington and Wheatenhurst. The Alluvial Deposits have been formed from clay and silt washed down by the river in the last 10,000 years.

The River Terraces were formed during periods of freezing and thawing as ice sheets advanced and retreated over Britain at the end of the Ice Age. In the interglacial periods the river was swelled by large quantities of water from the melting ice sheets which would carry eroded rock fragments downstream and deposit them as the floods spread out over the floor of the valley.
When the ice sheets advanced and the land was frozen, the sea level dropped. The volume of water in the river was reduced and the river would tend to flow down the middle of the valley, but the speed of the water was increased due to the steeper gradient to reach the sea. This caused the bed of the river channel to be eroded so that, over a period of time, it cut down into the floor of the valley leaving the gravel layer on the banks above.
In the next interglacial period, large amounts of melt water would again raise the sea level. The swollen river would flood and deposit debris on the “new” floor of the valley. This cycle was repeated several times, forming a series of gravel terraces which correspond to periods when the ice was melting, separated by “steps” corresponding to cold periods when the sea level fell and the river bed to a lower level. (Dreghorn, 1967)

The gravel terraces have soils which are better drained and more fertile than the cold, heavy lias clay of the Severn Vale. They have been hunted over since prehistoric times. The terraces provided relatively dry routes above the flood plain for travellers and were occupied by both the British and the Romans. (Fowler, 1971; Gloucstershire County Council Sites and Monuments Record.)

The Cainscross Terrace has yielded fossils and artefacts in the Stroud area, including bones from a mammoth which are in Stroud Museum. However, the Canal restoration will use the existing canal over the Cainscross Terrace near Chipman’s Platt, so it is unlikely that there will be many new finds.