

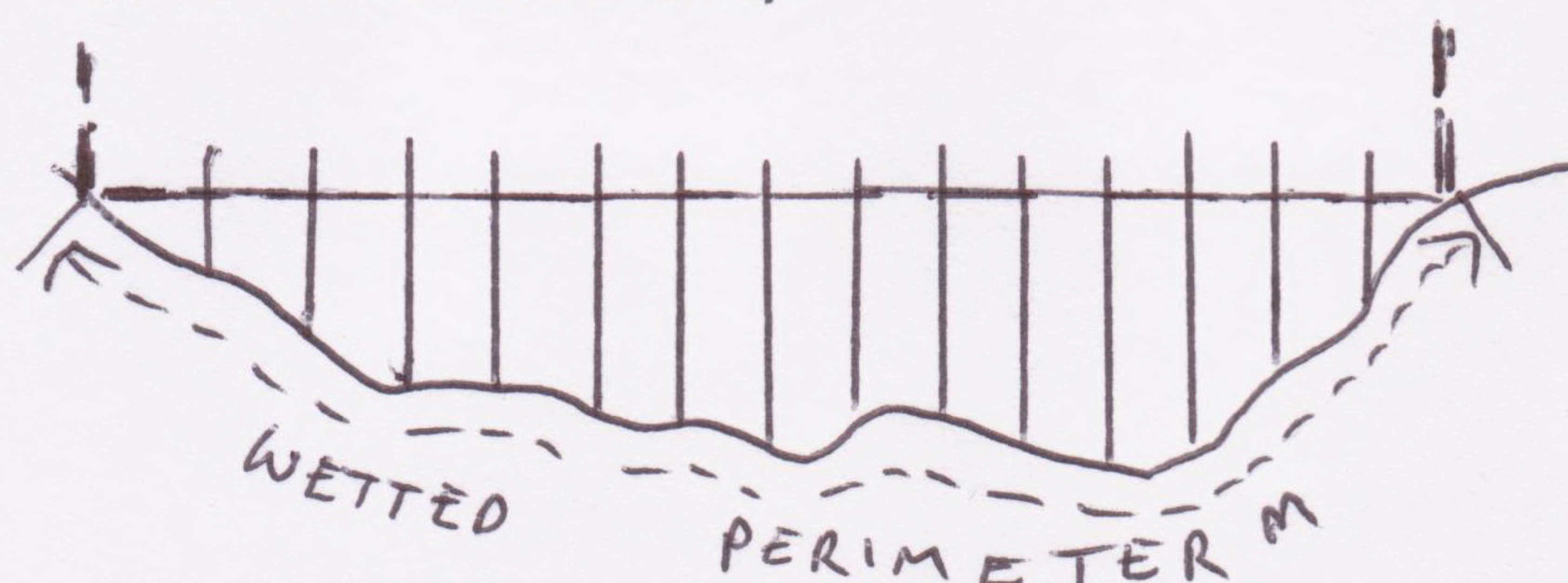
## PRIMARY DATA COLLECTION AND SAMPLING

8 sites were chosen at safe, accessible places along Waithe Beck, a stream with a spring source in the chalk of the Lincolnshire Wolds flowing eastwards (25-30km) across the boulder clay coastal plain to the North Sea at Tetney, just to the south of Grimsby. This is a pragmatic / convenience sampling technique which used ease of access, right of access and safety as the key factors.

A systematic sampling technique, say every 4km, may have give a more even spread of sites along the river, but the chosen sites may not have been accessible or straight. A pragmatic sample may miss out large sections of the river that are away from roads, and since the convenience sites chosen are near roads they may show the impact of human activities.

8 sites is enough to conduct a Spearman's Rank Correlation Coefficient test on the data collected, but more, possibly 10-20 would show patterns, changes and relationships better, especially over 20-30km.

At each site the depth was sampled using a metre rule (in metres) every 20 cm (0.2m) across the river, here using a systematic sampling technique to ensure full coverage of the cross section and take into account the fact that depth varies across the river, often being deepest towards the centre. This allowed the average depth and the cross section area to be calculated accurately.



RIVER CROSS SECTION

EQUIDISTANT SYSTEMATIC  
DEPTH SAMPLING (every  
20cm)

Av depth = total depth ÷ number  
of measurements

$$\text{CROSS SECTION AREA} = \text{WIDTH (m)} \times \text{AV. DEPTH (m)} = \text{m}^2$$

The wetted perimeter, the length of the bed and banks in contact with the water was measured using a chain or rope that sank to the river bed. This was then removed and the length of the wetted perimeter measured with a tape in metres

The Hydraulic radius, a measure of channel efficiency, was then calculated by dividing the cross section area by the wetted perimeter. A higher Hydraulic radius result indicates a more efficient channel with less friction on the water as it has a relatively small wetted perimeter. The larger and deeper channels found downstream tend to be more efficient with a higher Hydraulic Radius.

Measuring depth at points every 20cm across the river is sufficient to give a reasonably accurate average depth, but obviously more points will give a more accurate value. Measuring the depth every 10 cm across the channel would give a more accurate picture of channel depth, and a more accurate average depth and cross section area.