

MIRES ON THE MOOR EXMOOR FLOW MONITORING

A partnership of South West Water, the Devon Wildlife Trust, the Cornwall Wildlife Trust, the Westcountry Rivers Trust and the Exmoor National Park Authority is working to protect rivers in [Exmoor National Park](#).

CHALLENGE

Monitoring peat accumulating habitats and wetlands looking at surface and groundwater runoff.

Estimated flows from the surface waters can range from 1 l/s to 400 l/s, it is important to capture these flows accurately as the data is to be used in the Environmental Management Plan associated with the wider work of agricultural runoff and its impact on the mires at Exmoor. The terrain is rough and unaccommodating for regular motor vehicles, therefore quad bikes and quad carriers are to be used for transporting materials, tools and equipment.

DESIGN CHOICE

300mm Trapezoidal Flume (Material: PVC/GRP Composite for transportation purpose)

The trapezoidal flume is capable of handling a wider range of flows while maintaining confidence in the flow measurement. In addition to the range of flows, its deployment has very little impact on the natural water-course as the flume is designed with the water course in mind.



TECHNICAL REQUIREMENT

- Design and install a primary flow structure to measure upland surface water runoff
- Evaluate cost benefit of designs
- Identify components of error, and qualify their compounded corresponding uncertainties using methods derived from statistical theory into an overall result for the measurement process
- Assess variations in hydraulic flow with regards to rainfall

UNCERTAINTY BUDGET

Uncertainty calculations associated with the throat U_c^* (Q) is better than 7%. This is based on Cd Value uncertainties referenced in BS ISO 4359:2013

0.8 l/s to 450 l/s flow with an uncertainty of 6 % at the 95 % level of confidence is achievable

U_c^* of the A V Flow meter installed in the 300 mm diameter discharge pipe is estimated at 0.8 l/s – 165 l/s = 5 % (full range).

NON-MODULAR FLOW DISCHARGE

To maintain accuracy through the expected full range of flows a secondary monitor is to be located downstream to measure the change of drawdown as the flows exit the flume. This will trigger a remote alarm to indicate downstream maintenance or clearing is required.

For details of all calculations used for this design scope please contact [Detectronic](#) for the design file.

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