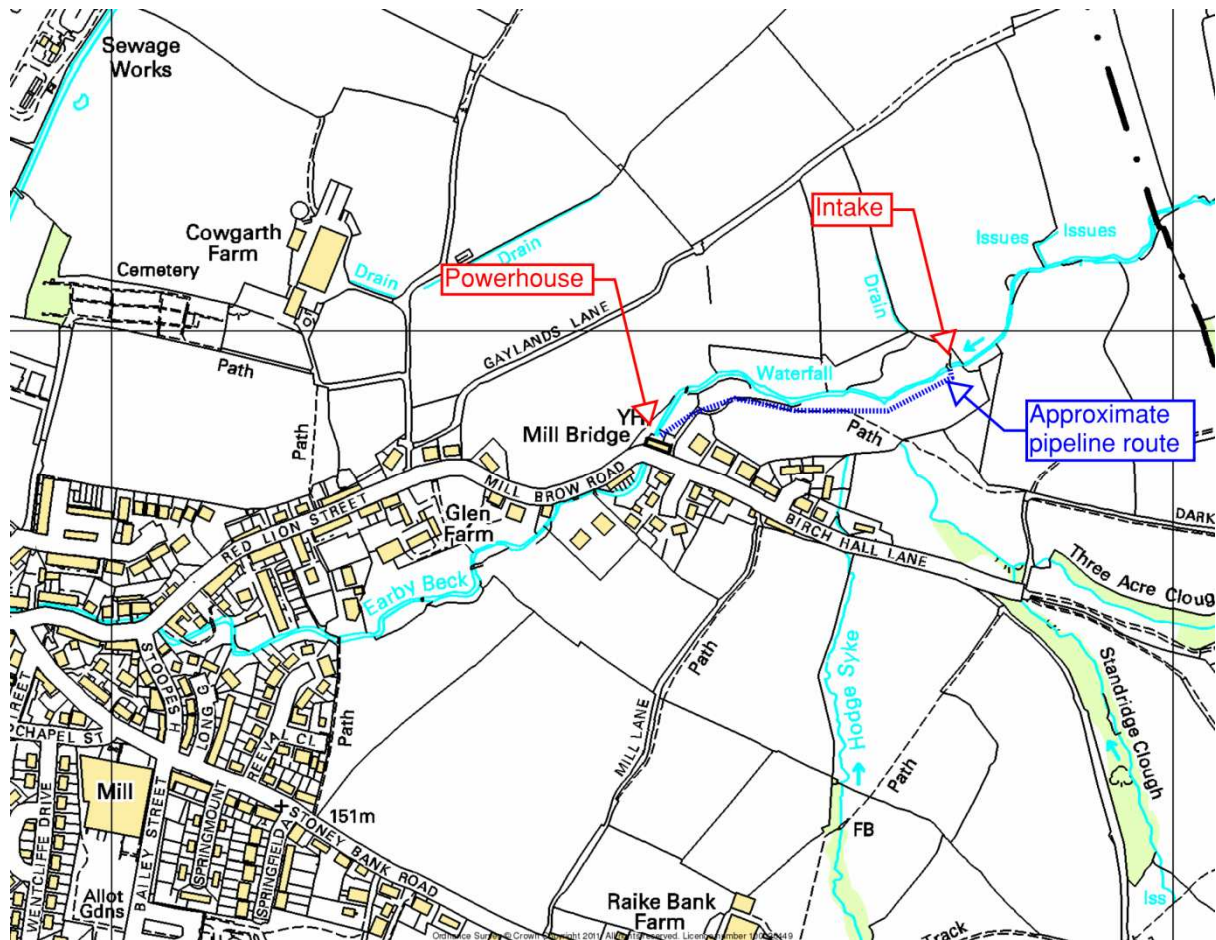


Site 22: Earby Youth Hostel

Site Assessment

Figure 1 Map showing general layout



Earby Youth Hostel is a former mill cottage on Birch Hall Lane, Earby. The nearby mill has long since been demolished. The building came into the hands of the YHA in the 1950s and it was comprehensively modernised in 1997 when the Member of Parliament for Pendle was invited to re-open the hostel. The youth hostel is now owned by Pendle Borough Council. It is within the Earby conservation area, and has an interesting history.

A scheme on this beck is likely to be relatively small. The best potential scheme would be to install an intake on the existing concrete structure just below the stone footbridge to the children's play area, and run a pipeline down to the garden or car park of the Youth Hostel to a small powerhouse. Parts of the historic leat route are still evident, and most of this route would be utilised for the pipeline. The pipeline route is relatively straightforward, but is a costly aspect of any scheme. Historically the entire beck would have been harnessed to produce power for the mill, but modern ecological protection standards require that some water remains in the beck to keep the habitat healthy.



Figure 2 The intake location at the bridge



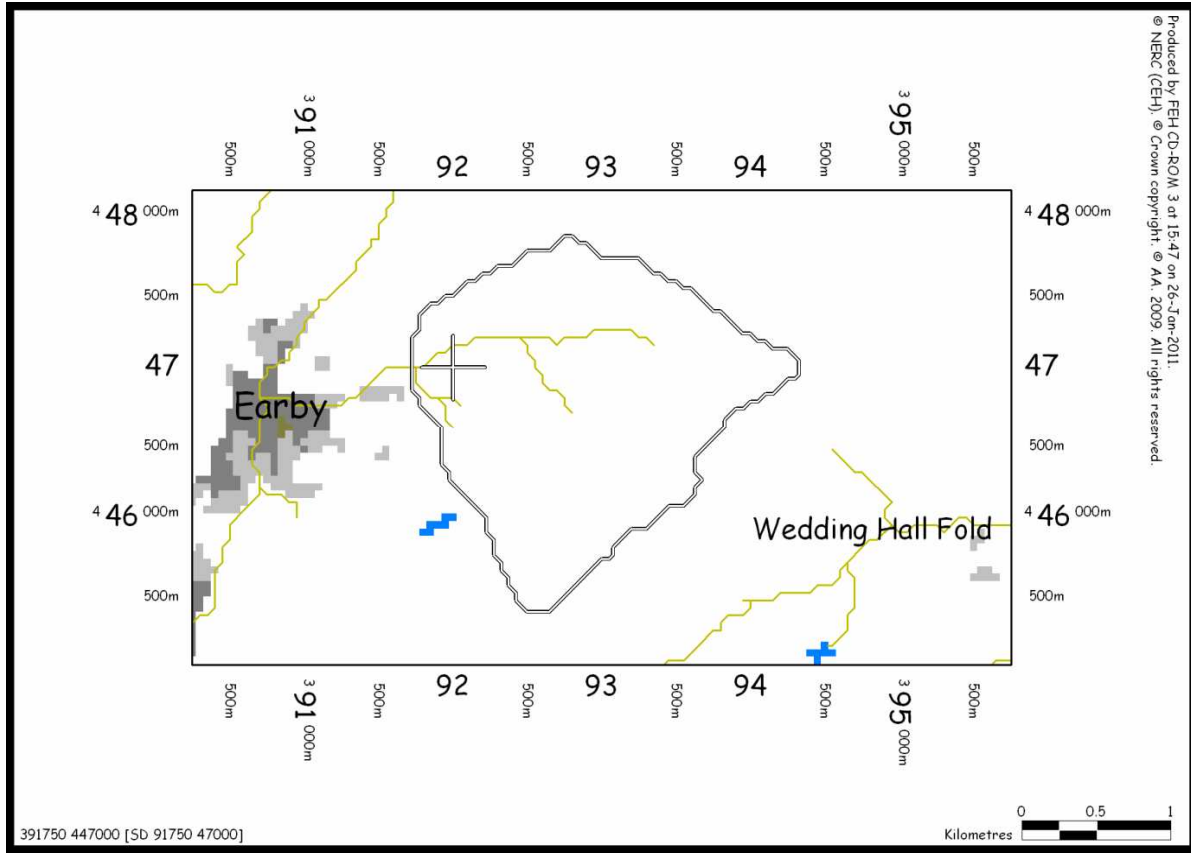
Figure 3 Along the pipe route



Figure 4 The potential powerhouse location above the youth hostel

Catchment Analysis

Figure 5 Catchment boundary defined by Flood Estimation Handbook Software



The Flood Estimation Handbook software is used to determine the following catchment descriptors, for the proposed intake location, selected during the site visit.

Intake Grid Reference	391790, 446970
Powerhouse Grid Reference	391520, 446910
Catchment Area	2.6 km ²
Annual Rainfall	1103 mm

Annual Flow Statistics

Low Flows software is used to produce a Flow Duration Curve (FDC), which demonstrates how the river flow varies throughout the year. It presents the percentage time of the year each flow rate is exceeded. A particular notation is used to refer to FDC flow rates; e.g. 'Q₉₅' refers to the flow rate which is exceeded 95% of the year.

Table 1 Mean flow rate and flow rate at Q₉₅

Period	Mean Flow Rate [m ³ /s]	Flow Rate at Q ₉₅ [m ³ /s]
Annual	0.0545	0.00683
January	0.0894	0.015
February	0.0698	0.0126
March	0.0694	0.0134
April	0.0469	0.0105
May	0.0326	0.00789
June	0.0219	0.00565
July	0.0232	0.00538
August	0.0351	0.00474
September	0.0399	0.00525
October	0.0577	0.0072
November	0.0771	0.0116
December	0.0906	0.0146

Table 2 Annual flow duration data

Exceedance Probability	Flow Rate [m ³ /s]
5	0.192
10	0.131
20	0.079
30	0.053
40	0.037
50	0.028
60	0.021
70	0.016
80	0.012
90	0.008
95	0.007
99	0.005

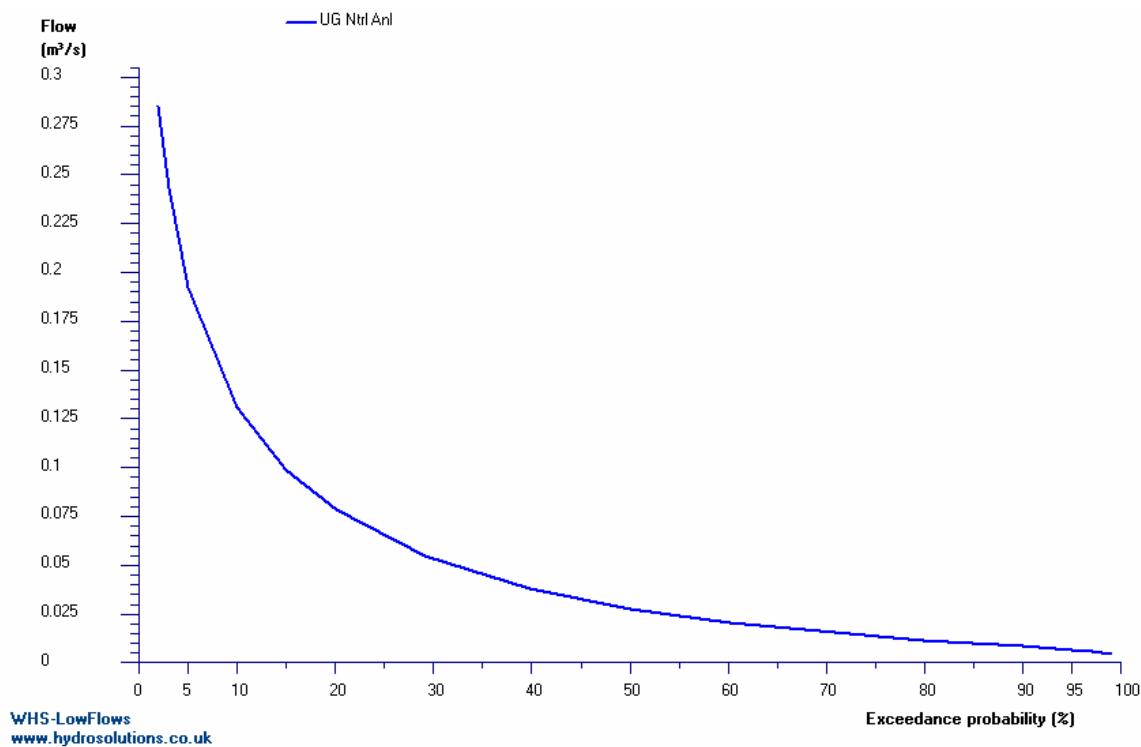


Figure 6 Annual flow duration curve produced using low flows software

Hydropower Analysis

Site: Earby
Run Date / Time: 12 January 2011 at 14:01

Mean Flow: 0.051 m³/s
Provisional Rated Flow: 0.057 m³/s
Residual Flow: 0.006 m³/s
Rated Flow: 0.051 m³/s
Gross Hydraulic Head: 10.00 m
Nett Hydraulic Head: 9.50 m

Applicable Turbines	Gross Annual Average Output	Nett Annual Average Output	Maximum Power Output	Rated Capacity	Minimum Operational Flow
Crossflow	15.5	15.3	3.8	3.6	0.014
	MWh	MWh	kW	kW	m ³ /s

Hands off Flow = Q95

Table 3 Hydropower Analysis

Gross Head [m]	10
Net Head [m]	9.5
Design Flow [m ³ /s]	0.05 m ³ /s
Rated Capacity [kW]	3.6 kW
Average Annual Energy Output [MWh]	15.5MWh
Average annual Carbon Dioxide offset	6.7 tonnes

Impact Assessment

Earby is not within the Forest of Bowland AONB. It is classified under the Lancashire Landscape Character Assessments as being on Rolling Upland Farmland. The site is within Earby Conservation area.

The Environment Agency will need to be consulted for advice on whether a fish pass will be required, depending on the design of the intake. Due to the existing layout of the site, the majority of the pipeline will run over the grassland of the playing field, but it is likely that a few small trees might need to be felled closer to the youth hostel building. This will require clarification, and then a survey to identify the tree species and any other associated species (e.g. bats).

The small concrete structure below the footbridge is currently used by children at the play area as a paddling pool in the summer. It may be necessary to make some alternative provision if an intake is to be placed here, and this will require consultation with the local community.

Statutory Requirements

It will be necessary to apply to the Environment Agency for an abstraction licence, and planning permission will need to be sought for the intake, pipeline and powerhouse. This mill cottage building is not thought to be listed.

An ecologist will be able to advise on the extent of environmental assessment required.

Budget Development Cost

The total budget cost for the whole scheme is **£254,000**. It should be noted that the civil works costs can vary considerably as material costs fluctuate. Likewise, mechanical and electrical (M&E) equipment costs vary in accordance with demand. Professional fees should be considered subject to change, as the scope of licensing and planning requirements are not yet defined. Consequently the budget estimate at this stage should be considered accurate to plus or minus 20%.

Revenue and Simple Payback period

The Youth Hostel will be able to use any energy produced by this scheme, and it unlikely that a grid connection will be necessary.

Under the current government feed-in tariff regulations, hydropower schemes receive a generation tariff according to their rated capacity. Schemes less than 15kW receive 19.9p/kWh. This generation tariff is received regardless of how the electricity is used. The owner has indicated that the electricity would be used on site, thereby offsetting import costs. This increases the value of the generated electricity by the import tariff, which we have assumed is 5p/kWh.

In conclusion, the total value of the generated electricity would be 24.9p/kWh, giving an average annual value of approximately **£3435**. The simple pay back time is therefore 74 years.

Conclusion

The payback time of this scheme would normally mean that this scheme is not economically feasible. Installing a pipeline is an expensive part of a hydro scheme, and unfortunately there may be insufficient water here to justify this.

Further Information

This site report is produced by Inter Hydro Technology on behalf of Forest of Bowland AONB, and funded by a partnership including Lancashire County Council, Lancaster & District Local Strategic Partnership, Pendle Borough Council and Ribble Valley Local Strategic Partnership.

This site report should be read in conjunction with the rest of the Forest of Bowland AONB Hydro Feasibility Study which can be downloaded at

<http://www.forestofbowland.com/climatechange#hydro>

Table 4 Development Budget Cost

Budget Scheme Cost Estimate

Earby Youth Hostel

	ITEM	UNIT	QUANTITY	MIN	MAX
Turbine					
	Turbine Quotation	No	1	£60,000.00	£75,000.00
Grid Connection					
	Grid Connection	No	1	£0.00	£0.00
Civils					
	Concrete Work	m ³	20	£10,000.00	£12,500.00
	Fish Pass	m ³	0	£0.00	£0.00
	Metalwork	m	4	£8,000.00	£10,000.00
	Fish Pass Length	m	0	£0.00	£0.00
	Pipe Installation	m			
	Rock	m	10	£1,100.00	£1,375.00
	Gravels	m	100	£4,000.00	£5,000.00
	Soft	m	200	£11,000.00	£13,750.00
	Pipe Materials	No	1	£30,000.00	£37,500.00
	Temporary Access	m			
	Rock	m	20	£8,800.00	£11,000.00
	Gravels	m	0	£0.00	£0.00
	Soft	m	0	£0.00	£0.00
	Temporary Access on Good Ground	m	0	£0.00	£0.00
Powerhouse					
	Powerhouse	kW	4	£15,000.00	£18,750.00
Prelims					
	Duration	Months	4	£12,000.00	£15,000.00
Sub Total					
	Sub Total			£159,900.00	£199,875.00
Professional Fees					
	Professional Fees			£23,985.00	£39,975.00
Sub Total					
	Sub Total			£183,885.00	£239,850.00
Contingency					
	Contingency			£36,777.00	£47,970.00
GRAND TOTAL				£220,662.00	£287,820.00