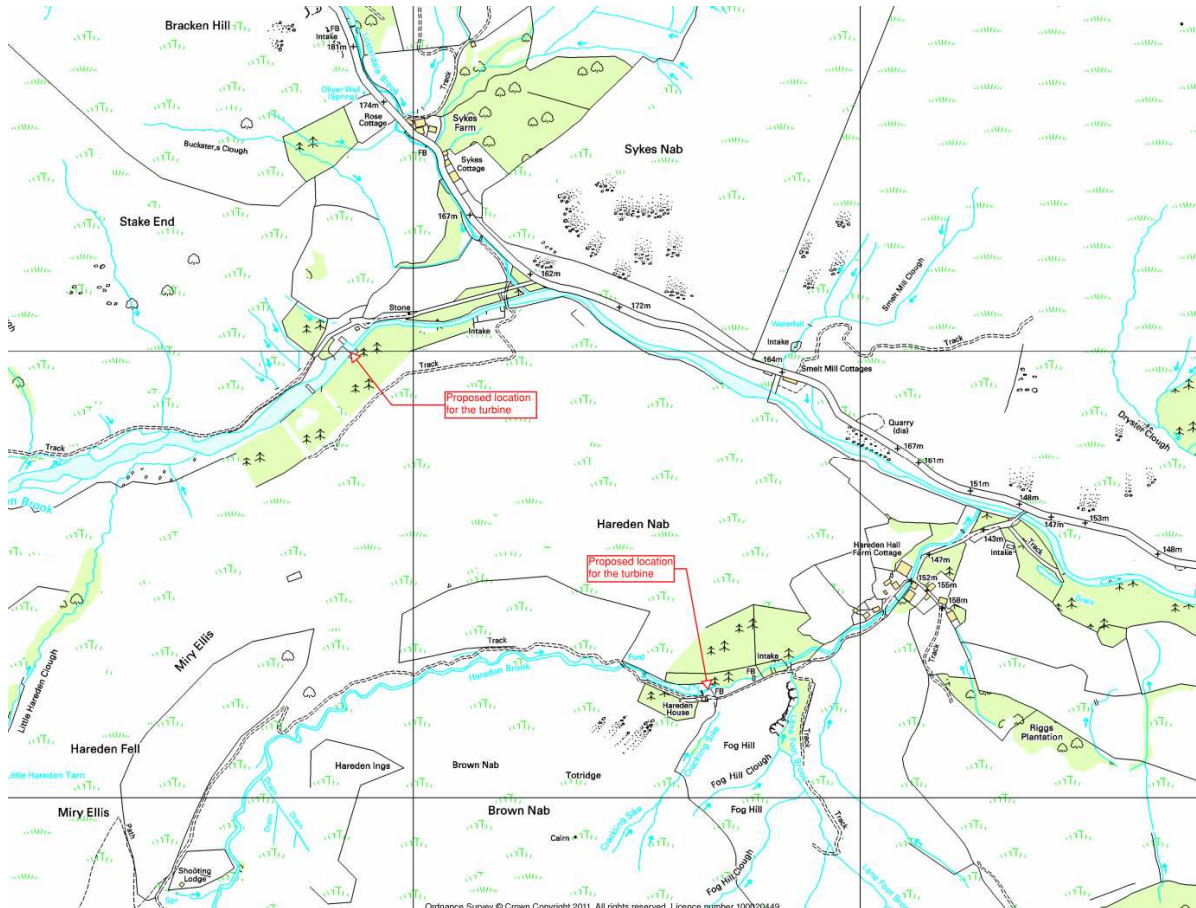


## Site 20: Hareden Intake

### Site Assessment

Figure 1 Map showing general layout



United Utilities have two intakes in close proximity on two adjacent catchments – Hareden and Langden. Both of these intakes have active abstractions and large spillways with an associated salmon ladder. If it were possible to constrain the over flow into one channel through (for example) an Archimedes screw turbine, energy could be generated at these sites. However, making a reasonable prediction of the flows at these sites over a year is difficult, and without this data, getting an idea of the potential of these sites is not possible.



Figure 2 The weir



Figure 3 The weir



Figure 4 The salmon ladder

## Catchment Analysis

The standard method of assessing the catchment using the Flood Estimation Handbook software is irrelevant to this site due to its modified nature.

Intake Grid Reference	363630, 450230
Powerhouse Grid Reference	363630, 450230

## Annual Flow Statistics

Unfortunately, the Low Flows software used to produce a Flow Duration Curve (FDC), demonstrating how the river flow varies throughout the year cannot be used for this site, as there are too many artificial influences. It is difficult to predict the likely over flow here, as the demand will vary significantly. United Utilities are best placed to assess whether there is a consistent enough surplus flow (plus the necessary compensation flow) to warrant any further investigation of a hydro scheme.

## Hydropower Analysis

Due to the difficulty in predicting likely flows at the site, it has not been possible in the time available to generate a potential power output, annual average energy production, or carbon dioxide offset. With close co-operation with United Utilities it may be possible to make an accurate assessment of whether this site warrants further investigation.

## Impact Assessment

This site is within the Forest of Bowland AONB and is classified as Unenclosed Moorland Hills. Development here has minimal impact on the landscape due to the existing infrastructure. The spillway weirs are an interesting feature and the installation of a turbine would result in less water over these weirs.

Provision for fish passage has already been made at this site due to the existing intake.

## Statutory Requirements

It will be necessary to consult with United Utilities and the Environment Agency for advice on abstraction and available water. It is likely that planning permission will be required for the installation of a turbine.

It is not thought that the spillways are listed. An ecologist will be able to advise whether any environmental assessment will be required.

## Revenue and Simple Payback period

Due to the erratic flow regime over the spillway at this site it is very difficult to assess the likely power and energy generation potential. Therefore, it is not known whether a grid connection is likely to be economic. A small capacity scheme may be useful for any power needs on site at the intake. Alternatively power could be supplied to the adjacent building which is thought to be privately owned. Due to the inconsistent flow it is probably unlikely that a grid connection is necessary. The revenue and simple payback times have not been estimated due to the lack of information on available flows.

## Conclusion

It is likely that a full investigation into the hydro power potential at this site is only possible if United Utilities carry it out themselves. Conventional desk top methods of procuring information on flows are not relevant due to the modified catchment. However, the existing weir infrastructure, proximal grid connection and excellent existing access to this site make it worth further investigation.

## 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>