

Afon y Foel micro-hydro station – civil works summary.

The micro-hydro station will provide electricity to Hafod y Rhedwydd. This cottage is completely off-grid: there will be no grid connection.

Depending on the level of water in the stream, the system will be able to provide up to 9 kW for the cottage.

Water will be extracted from Afon y Foel at a point 35 m higher than the house. The pipe length to the house is 380 m.

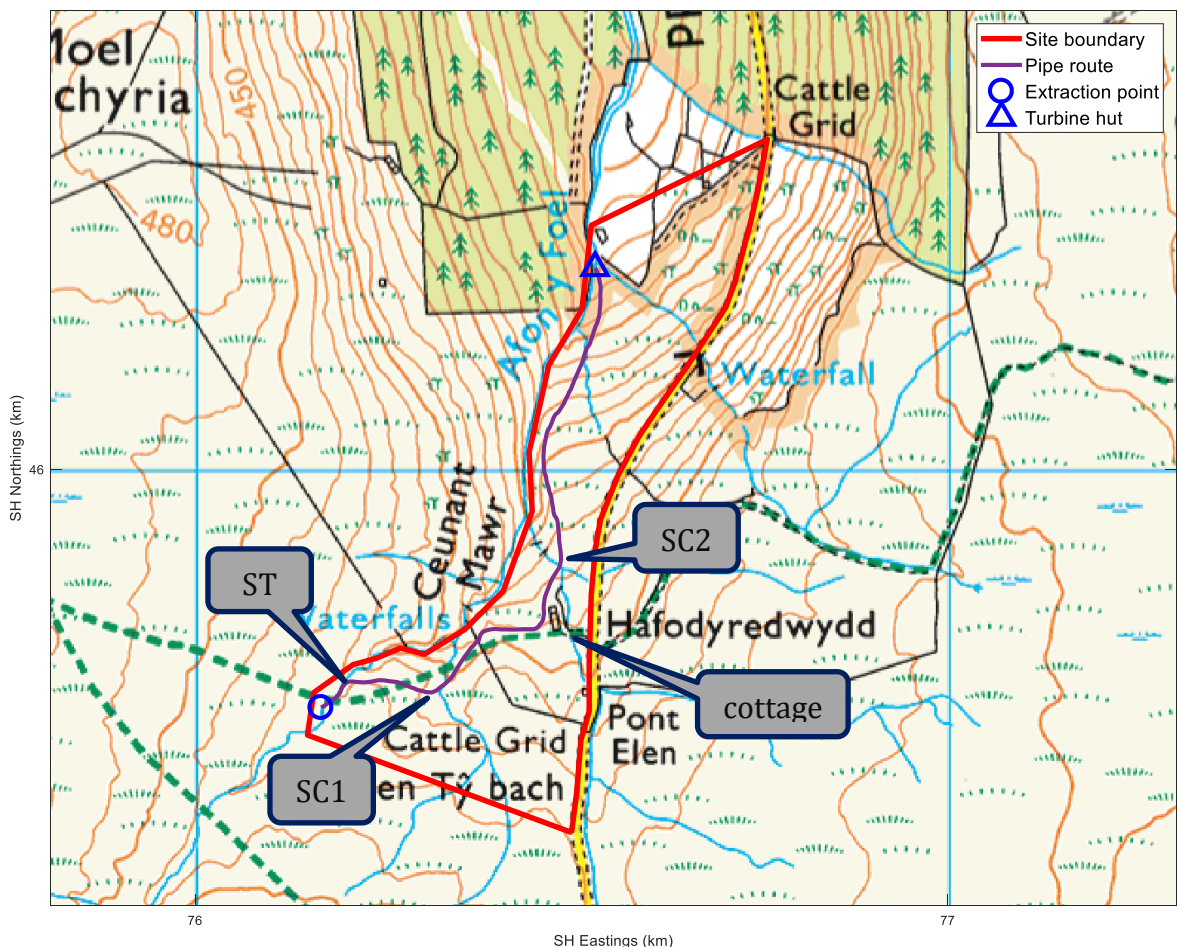


Figure 1. Map showing extraction point, settling tank, pipe route, stream crossings and turbine hut. Map scale 1: 10000 (grid squares are 1 km wide). OS map is © Crown Copyright, reproduced by permission of Ordnance Survey. (Map purchased from Blackwells Mapping Online 5/12/2018, order number BW1-899389-43094-051218). ST = settling tank, SC = stream crossing. (See also drawings HyR_190418A-1.pdf and HyR_190418A-2.pdf)

The penstock will have a tee-off to the house before continuing for another 475m to the turbine hut to achieve a total head of 150m. A 65 mm twin-wall conduit buried alongside the penstock will contain the power cable and an optical fibre carrying control signals and water level data.

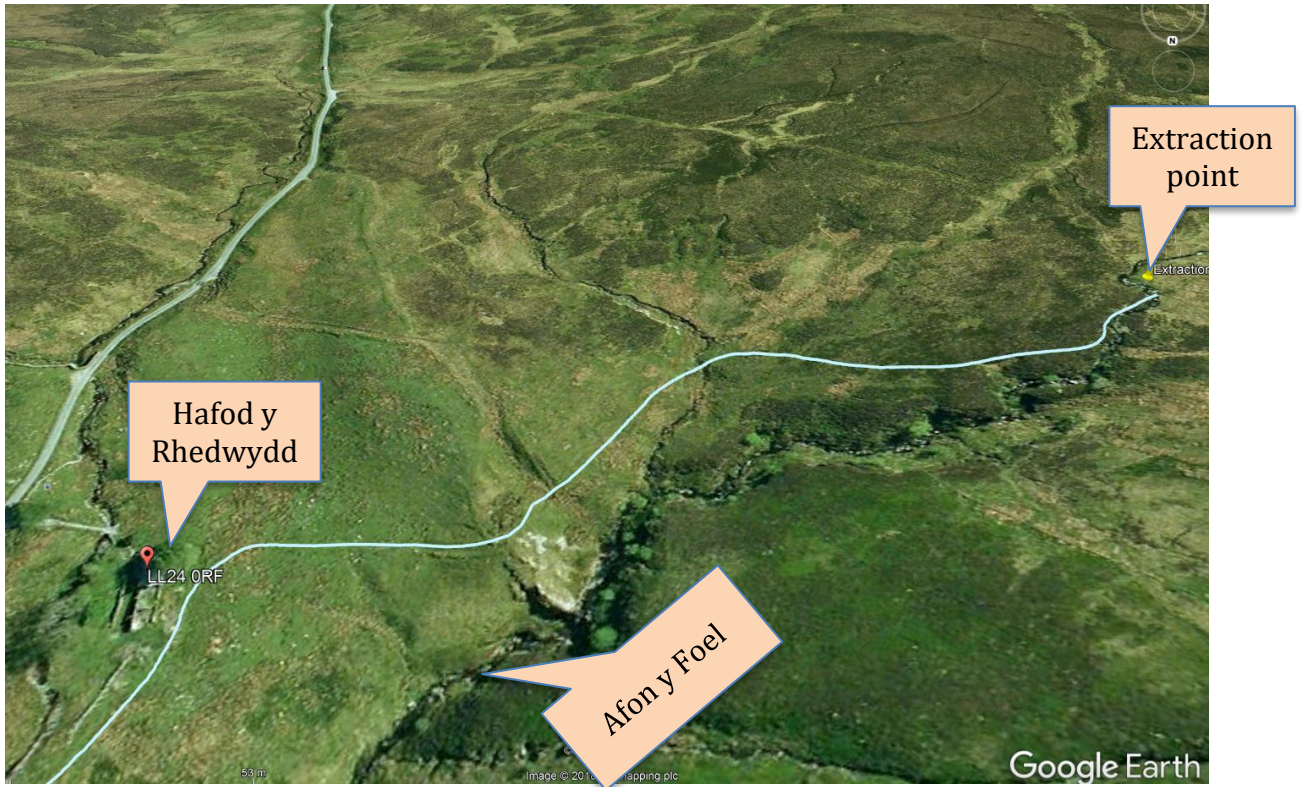


Figure 2. Route of upper section, looking South.



Figure 3. Small waterfall at the extraction point. Stick with tape at 1 m intervals to show scale.

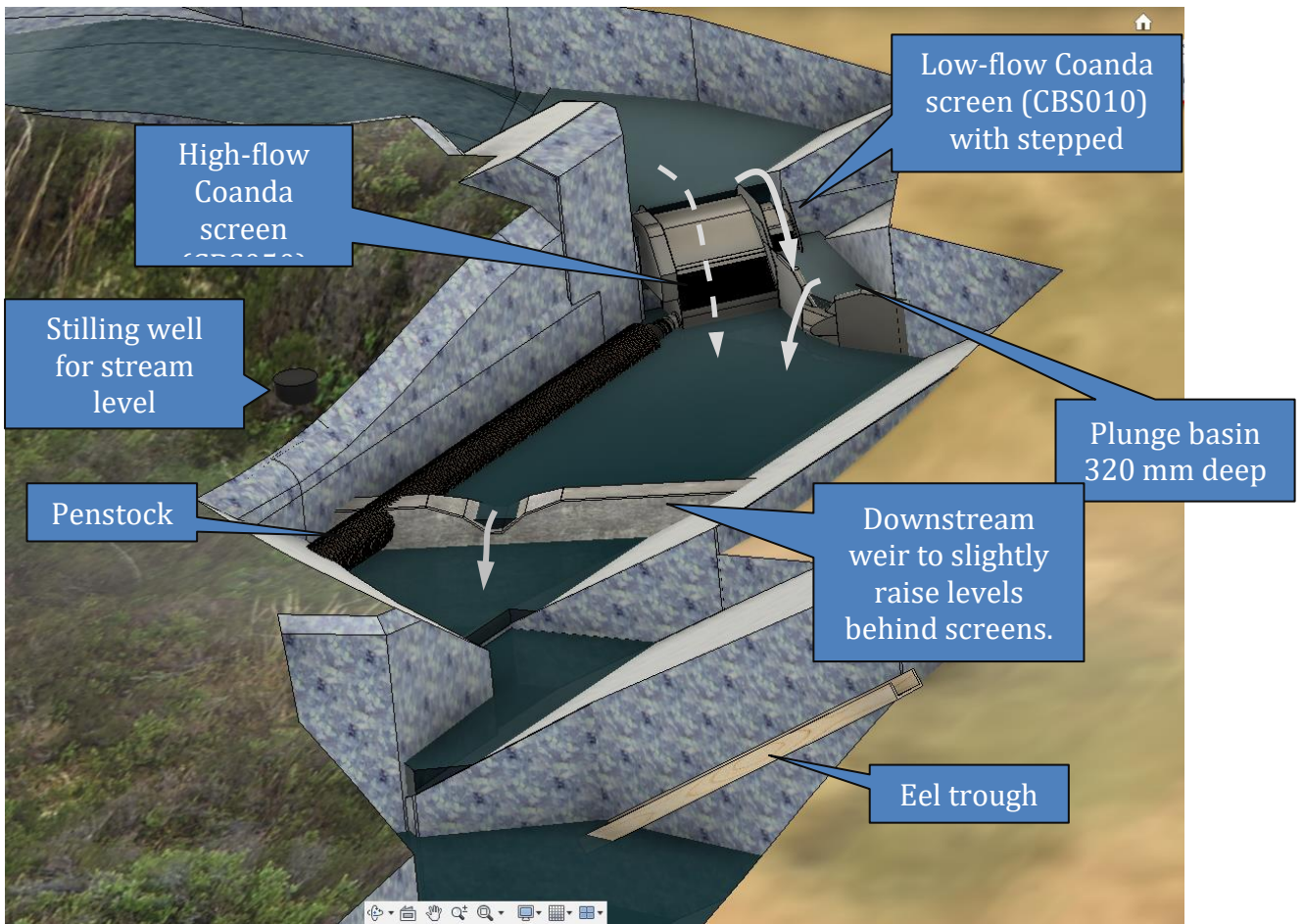


Figure 4. Abstraction system. Fish can progress up and downstream in three stages (black arrows, jumps of 25 cm or less). Water levels shown for stream flow of 4 litres/sec, Q95. At higher stream levels, water starts to flow over the high flow screen (dashed arrow).

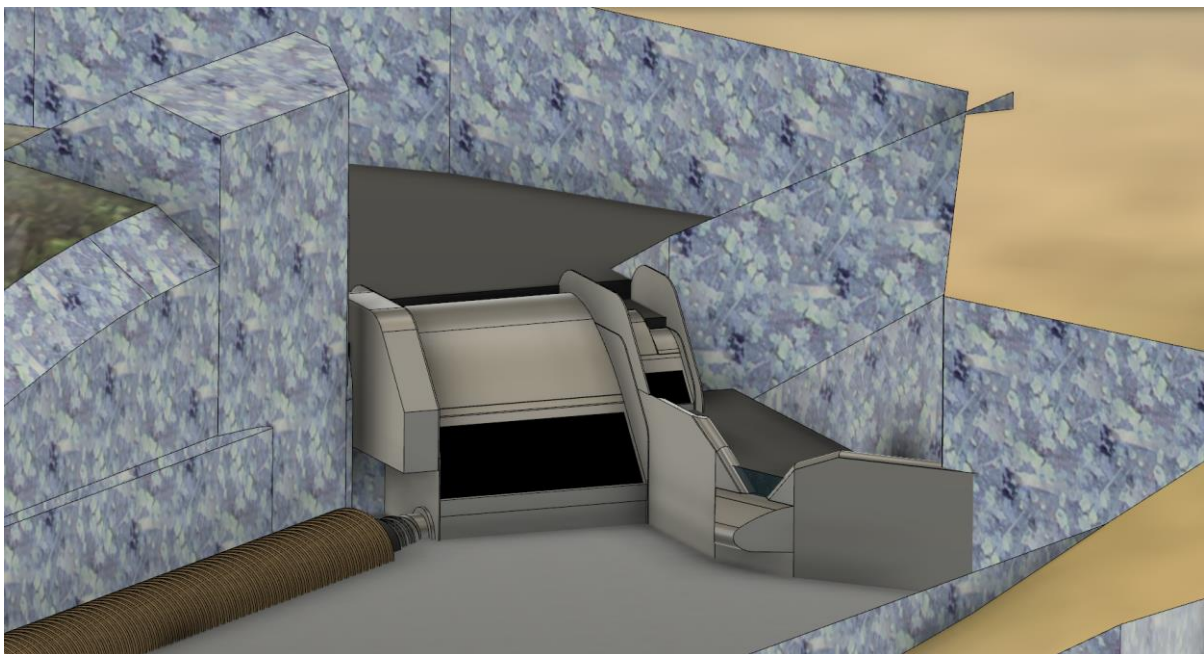


Figure 5. Enlarged view of the main Coanda screen plus smaller screen to allow domestic abstraction beyond Q95.

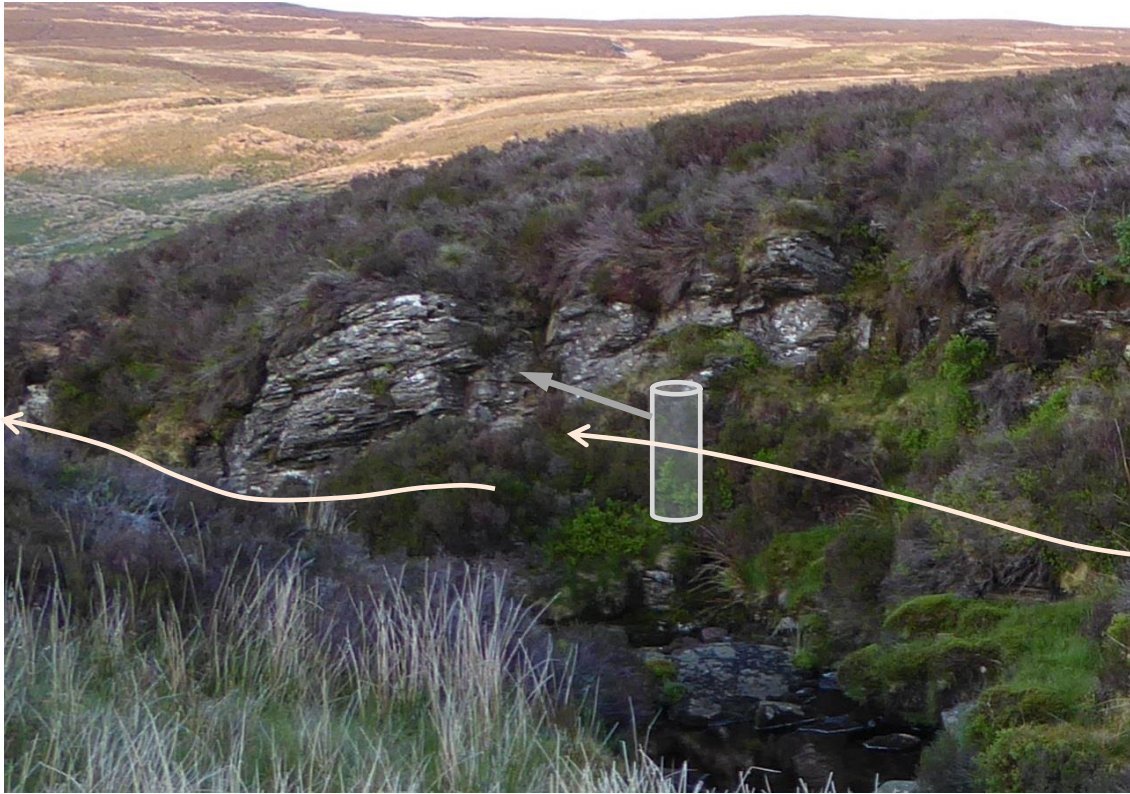


Figure 6. The settling tank will be bolted into a cleft in the rock face approximately 40 m from the extraction point. The tank will contain a level sensor to warn of any obstruction to flow due to screen blockage.



Figure 7. Pipe route (upper half).

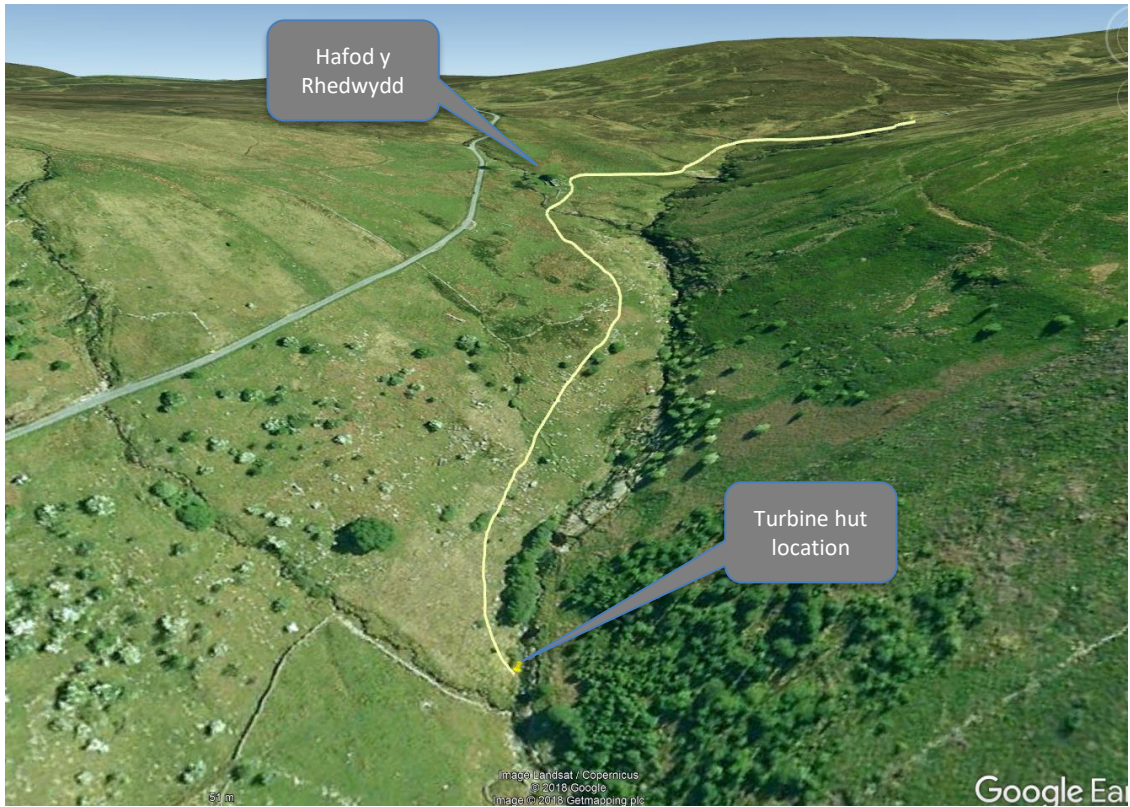


Figure 8. Pipe route below the cottage.



Figure 9. Turbine hut location.

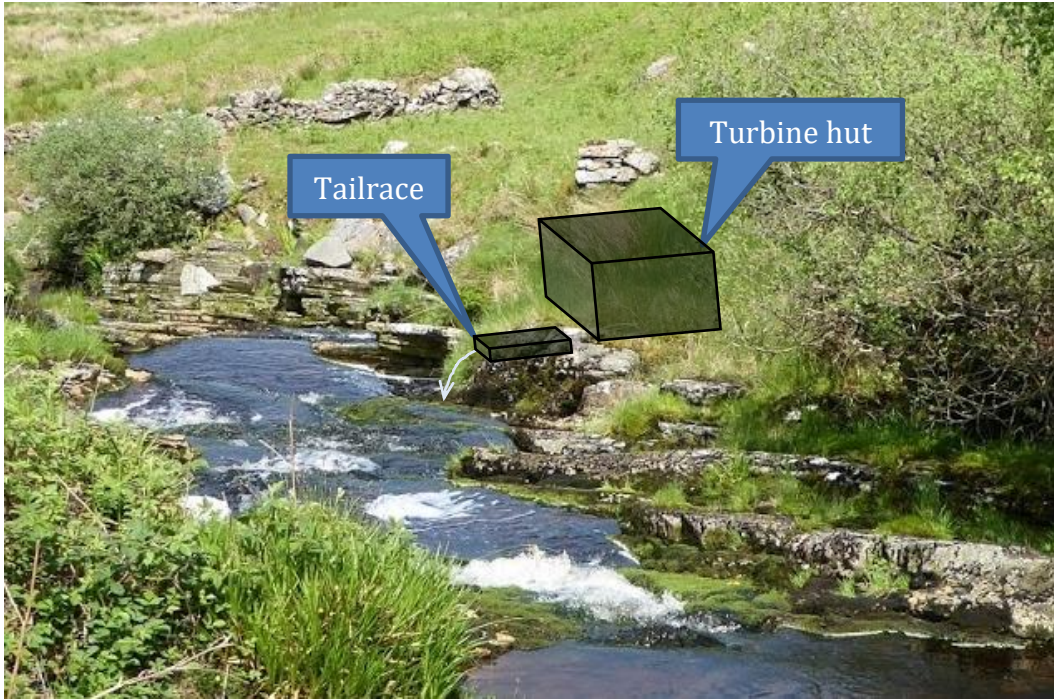


Figure 10. Tailrace will discharge back into Afon y Foel.

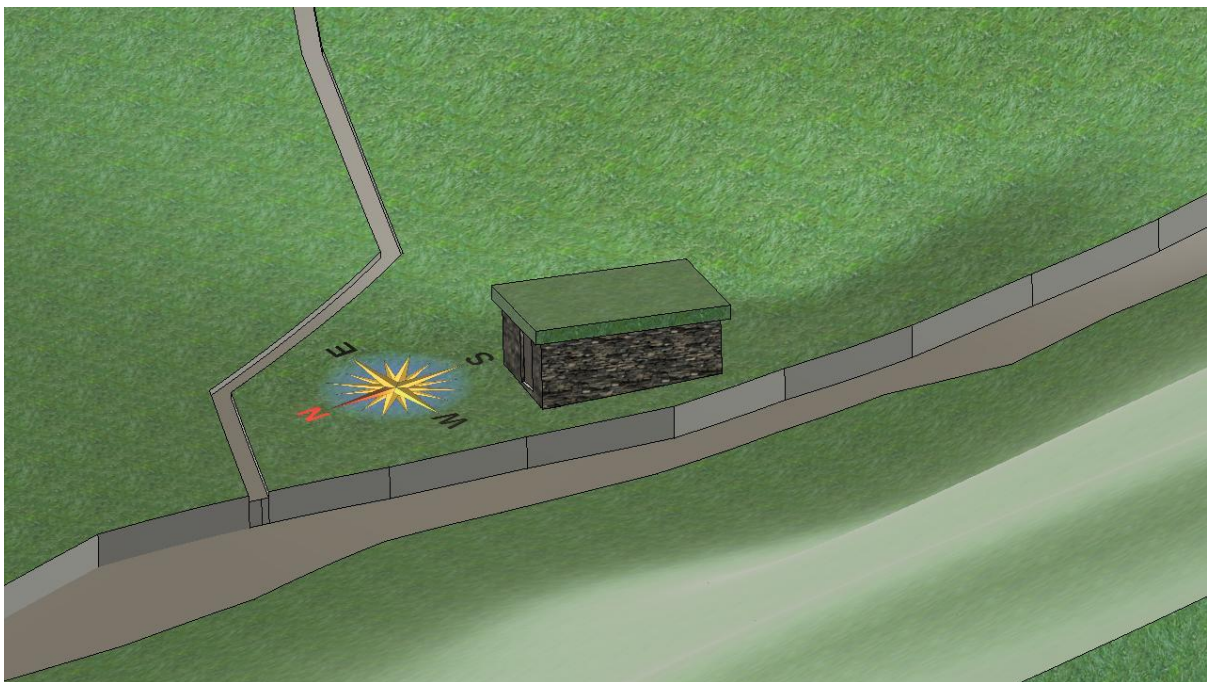


Figure 11. Turbine hut appearance (4.6 m × 2.8 m externally).

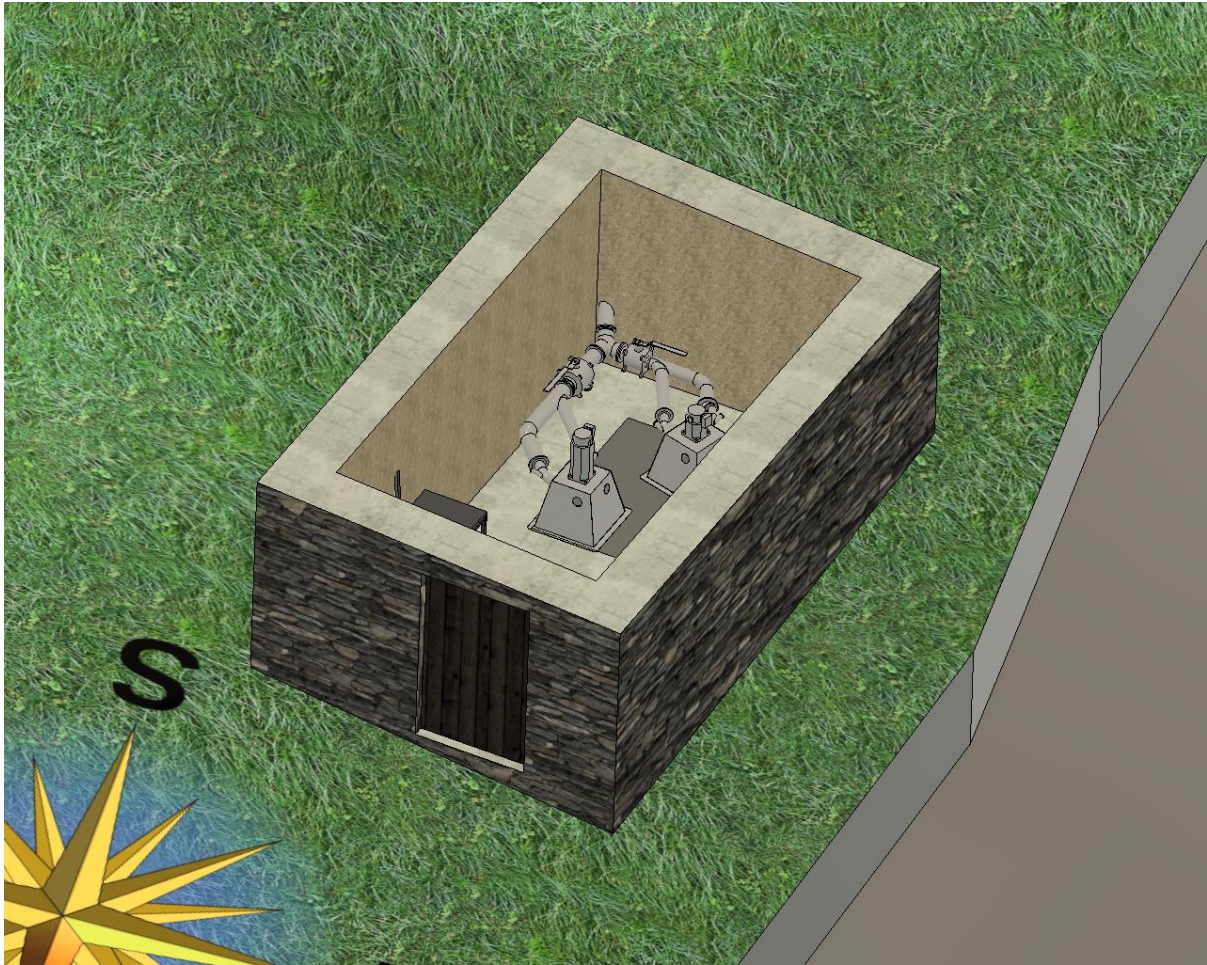


Figure 12. Turbine hut internal layout showing wet weather and dry weather turbines. (Height 1.5 m floor to ceiling).

The turbine control system will adjust the spear valves to vary the extraction rate in response to power required and water availability.

RWM
18/4/2019