

Aberdunant Hall Holiday Park

Proposed Micro-Hydroelectric Power Generation Scheme

Design Statement: Intake Structure

The intakes will have the required parameters from the licence designed into the structure.

Hands off Flow

The Hand off Flow will be maintained at all times via a notch that is below the level of the weir crest. The dimensions of the notch are of 150mm wide by 50mm deep and it will have a variable plate to allow fine adjustment.

The Q95 flow for the catchment area is 5 litres per second (lps), therefore across three intakes it is 1.7 lps per intake.

To achieve this with the 150mm wide notch the depth will be set at 34mm. The design calculation for this is as follows:

$$\text{Flow through notch} = 1.8 * \text{width of notch} * \text{depth of water}^{1.5}$$

$$\text{Flow} = 1.8 * 0.15 * 0.034^{1.5} = 1.7 \text{ lps}$$

Percentage take

The proposed percentage take is achieved by dividing the weir into two sections horizontally according to the percentage. The screen section is 1000mm wide and the residual flow section is 430mm wide, thus the percentage of water that flows over the residual flow section is $430/1430 = 30.1\%$.

Maximum abstraction rate

The maximum abstraction rate is determined by the design and specification of the turbine, which will not be able to take more than the permitted maximum rate.