

Design statement for Bryn Cemlyn Hydro Abstraction

8/7/2026

Flow Split

The scheme has been designed to be able to abstract no more than 50% of the flow above the HOF (hands off flow). This is ensured as the screen notch is of equal width (500mm) as the flow split notch, as shown in the drawing, thus ensuring a 50:50 split

Hands off Flow

The scheme has been designed to deliver the HOF of 1.4 l/s.

This is ensured using a 40mm diameter pipe set 284mm below the crest of the screen notch as shown in the drawing.

The water velocity (v) through a nozzle of this type is:

$v = \sqrt{2 \times g \times h}$ where g is the acceleration due to gravity and h is the head pressure (sqrt = square root)

In this case

$$v = \sqrt{2 \times 9.81 \times 0.284} = 2.36 \text{ m/s}$$

The flow $Q = v \times A$ where A is the area of the nozzle.

$$A = \pi \times r^2 = 3.14 \times 0.02^2 = 0.00126 \text{ m}^2$$

$$\text{Therefore } Q = 2.36 \times 0.00126 = 0.00296 \text{ m}^3/\text{s} = 3\text{l/s}$$

This is double the required HOF in order to give a margin for safety.

Rated flow

The rated flow is 12.5 l/s ie. 45 m³/hr or 1080 m³/day. This is below the annual daily flow at the site which is 14 l/s.

The maximum flow the scheme can abstract is limited by the capacity of the screen, the capacity of the pipe and mainly the capacity of the turbine.

Flow Modelling

The low flows modelling is attached to this application. This was run at a location further downstream with a higher catchment. Therefore scaling by catchment the flows at the intake location are shown in the table below.

	LF location	Intake location
Basin area	0.345	0.302 km ²
Adf	0.016	0.014 m³/s
Q5	0.0554	0.0485 m ³ /s
Q10	0.0388	0.0340 m ³ /s
Q20	0.0244	0.0214 m ³ /s
Q30	0.017	0.0149 m ³ /s
Q40	0.012	0.0105 m ³ /s
Q50	0.0087	0.0076 m ³ /s
Q60	0.0063	0.0055 m ³ /s
Q70	0.0046	0.0040 m ³ /s
Q80	0.0034	0.0030 m ³ /s
Q90	0.0022	0.0019 m ³ /s

Q95	0.0016	0.0014 m3/s
Q98	0.0013	0.0011 m3/s
Q99	0.0009	0.0008 m3/s