

# Form WRD: Application for a new abstraction licence or a technical variation to an abstraction licence

## Application type

Reference number (The number you generated in form WRA). Example:  
WRNATURALRESOURCESWALES1101

WRGREENBLADEENGINEERING1909

For hydropower abstractions, specify the capacity (in kilowatts) of your scheme.

>25 to 50kW

Are there any applications currently being assessed by us that are linked to this application?

No

Is the proposed abstraction going to be aggregated with another existing abstraction?

No

Are any applications, at the same site; being assessed by the Environment Agency?

No

## Abstraction details

Abstraction location name/reference

Intake

Abstraction point type

Single point

National Grid Reference

SH 79432 18555

Do you have any further points of abstraction?

No

## Means of abstraction

Provide full details of the equipment you propose to use to abstract water, such as maximum pump capacity and any relevant dimensions, e.g. pipe diameter. For groundwater abstractions, include details about the borehole (depth and diameter) and details of screening and lining.

A pre-fabricated steel intake weir is proposed. It will be sealed to the existing boulders and bedrock with concrete. It will span the full width of the watercourse with a 1.3mm aperture coanda screen. The penstock (pipe), from this weir to the turbine, is 280mm external diameter and made from High Performance Polyethylene (HPPE). See attached intake weir drawings 22091401, 22091402 & 22091401.

Please upload your drawings and calculations here. (Spreadsheet file formats need to be: .xls, .xlsx, or .ods)

- File: Flow duration curve, catchment area & hydrology assessment.pdf - [Download](#)
- File: 22080503-v2 Mark Sealy, Brithdir Forest Hydro - Powerhouse, Penstock and girder bridge section and levels.pdf - [Download](#)
- File: 22080502-v2 Mark Sealy, Brithdir Forest Hydro - Powerhouse and Outfall General Layout.pdf - [Download](#)
- File: 22080501-v2 Mark Sealy Brithdir Forest Hydro - Powerhouse and Outfall section and levels.pdf - [Download](#)
- File: 22091401-v1 Mark Sealy Brithdir Forest Hydro Intake Front Elevation, Levels and Take Calcs.pdf - [Download](#)
- File: 22091402-v1 Mark Sealy Brithdir Forest Hydro Intake Long Section.pdf - [Download](#)
- File: 22091403-v1 Mark Sealy Brithdir Forest Hydro Intake GA and Nomenclature.pdf - [Download](#)

## Abstraction quantities

Abstraction location name/reference

Intake

What purpose will the water be used for?

Hydropower

Period of abstraction Will it be all year?

Yes

Maximum quantities (cubic metres)

**Annual** 1,614,643

**Daily** 4,423.7

**Hourly** 184.3

Peak abstraction rate (in litres per second)
51.2
Number of hours of abstraction per day
24
Add quantities for another location?
No

## Calculations and supporting information

Use this section to show us how you have calculated the amount of water you require. This should include details of your operational regime (for example, number of hours and days you intend to abstract, number of units produced or area to be irrigated). We use this information to determine if the volumes you propose to abstract are appropriate for the purpose. Depending which industry you are in, you may need to provide additional information below.

If your proposal involves the provision of a residual flow via a notch or orifice, provide information on how this is being calculated. This should include details of the equation being used.

It is intended that abstraction take place all year round.

Maximum instantaneous flow (Design flow): 51.2l/s

Max hourly abstraction (Design flow x 3600 sec): 184.3 cubic metres

Max daily abstraction (Max hourly abstract x 24h): 4,423.7 cubic metres

Max Annual abstraction (Max Daily Abstraction x 365 days): 1,614,643 cubic metres

The broad crested 'Hands Off Flow' notch has been sized to pass Q95 of 14 l/s using the following formula:

$$Q = C_d * w * h^{1.5} = 1.6 * 0.291 * 0.097^{1.5} = 14.07 \text{ l/s}$$

(w = notch width, h = notch height and  $C_d$  = the coefficient of discharge)

In addition the ratio of the width to the height is 3:1 as per NRW guidance regarding safe fish passage.

## Industry-specific requirements

	% abstraction and zone applied for	Average gradient of depleted reach (%)	Catchment size above abstraction point (kilometres squared)	Net head between abstraction and discharge points (metres)
	70% Zone 3	8%	2.256	97.5m (weir crest level to the confluence of the outfall's tributary and Nant Helygog)

	<b>Turbine efficiency (%)</b>	<b>System efficiency (%)</b>	<b>Maximum power output (kilowatts)</b>	<b>Annual capacity (kilowatt hours)</b>
	85%	77% (turbine, generator combined)	34	175000

State the length of depleted reach (in metres)

1265

Provide the flow data (in cubic metres per second) & ratios specified below:

**Q95** 0.014

**Q10** 0.292

**Qmean** 0.126

**What is the ratio of Q95:Qmean?** 0.11

**What is the ratio of Q10:Qmean?** 2.32

What low flow protection (Low flow protection is the flow rate above which abstraction can begin and is separate to the abstraction % take) do you propose to maintain in the depleted reach when the hydropower scheme is operating (in m<sup>3</sup>/s)?

0.014

## Means of measurement

State how you intend to measure the quantity of water you abstract. You do not need to do this for a temporary or transfer licence.

Power Generated

## Water efficiency

Provide details of what measures you provide or intend to implement, to ensure efficient use of water. This could include water storage, re-use or recirculation, monitoring and checking for leaks, undertaking water audits or other industry specific good practice.

A high efficiency turgo turbine and induction generator are proposed.

## Fish and eel considerations (surface water abstractions only)

Does your proposal include measures to safeguard fish and eels? Only provide details of outfall screening if abstracted water is to be discharged back into a watercourse. For further guidance on appropriate screening Intake screening for fish

	Intake	Outfall
Type of fish screen	Coanda	Vertical flat bar
Screen aperture size (mm)	1.3	40

Confirm the fish species present at your site. If you're not proposing any measures to protect fish and eels, you must justify this. For example, we may have confirmed in our pre-application response that the intake is inaccessible to fish or you undertook a fish survey to confirm.

Unknown.

## Discharge details

If you intend to return any of the abstracted water to the environment, provide details below. Details of discharge location(s) should correspond with any maps submitted. Do not include discharges to a public sewage system.

	Discharge location name / reference	National Grid Reference of discharge point (12 digit)	Total volume to be discharged (cubic metres)	Environmental Permit for Water Discharge Activity number (if applicable)
	Outfall	SH 79205 19597	All the abstracted water	N/A
	-	-	-	-
	-	-	-	-
	-	-	-	-

Provide a description of the structure and equipment involved in discharge.

A 450mm HDPE tailrace pipe will capture the water from underneath the turbine and transfer it a distance of 11m to a masonry headwall with a flared apron to reduce the water velocity. The screen will be made using vertical steel flat bars spaced by 40mm. See the attached drawing 22080503.

## Other abstractors / water users

Provide details of nearby abstractors or users of water who could be affected by your proposal. This should include deregulated users (exempt activities or abstractions < 20 cubic metres per day), anglers and canoeists. Your local authority's environmental health will hold details of exempt domestic abstractors.

None

## Planning application

Have you sought advice on your planning application?

No

## Declaration

By signing below, you are declaring that, to the best of your knowledge; the information given in this form, on any map and in any supporting or additional information; is true.

**Signed** Mark Sealy

**Print name** MARK SEALY

**position** Owner

Date

\* 23/09/2022

Would you like a copy of your submission?

Yes

Your email address

greenbladeseng@gmail.com