# 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 |
| --- |
| WRGREENBLADESENGINEERING1903 |

| 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 79433 18557 |

| 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.

The proposal is to build an intake weir. 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). Please see the attached intake weir drawings 23030801, 23030802 & 23030803.

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

- File: 221029LB01-v2 Intake Reference Points.pdf - Download
- File: 23030701 Mark Sealy Dolgellau - Powerhouse section and levels.pdf - Download
- File: 23030702 Mark Sealy Dolgellau - Powerhouse General Layout.pdf - Download
- File: 23030704 Mark Sealy Dolgellau - Powerhouse Plan layout - location of reference points.pdf - Download
- File: 23030710 Mark Sealy Brithdir Outfall.pdf - Download
- File: 23030801 Mark Sealy Dollgellau Intake Front Elevation, Levels and Take Calcs.pdf - Download
- File: 23030802 Mark Sealy Dollgellau Intake Long Section.pdf - Download
- File: 23030803 Mark Sealy Dollgellau Intake GA and Nomenclature.pdf - Download
- File: Energy output prediction with flow duration curve & catchment area .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** 1617797

**Daily** 4432.3

**Hourly** 184.7

Peak abstraction rate (in litres per second)

51.3

| 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): 51.3l/s
Max hourly abstraction (Design flow x 3600 sec): 184.7 cubic metres
Max daily abstraction (Max hourly abstraction x 24h): 4,432.3 cubic metres
Max Annual abstraction (Max Daily Abstraction x 365 days): 1,617,797 cubic metres

The broad crested ‘Hands Off Flow’ notch, in the intake weir's crest, has been sized to pass Q95 of 14 l/s using the following formula:
Q = Cd * w * h^1.5 = 1.6 * 0.291 * 0.097^1.5 = 14.07 l/s
(w = notch width, h = notch height and Cd = the coefficient of discharge)

In addition, the ratio of the width to the height is 3:,1 as per NRW's 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 | 87.7m (turbine's net head at full power) |

| | Turbine efficiency (%) | System efficiency (%) | Maximum power output (kilowatts) | Annual capacity (kilowatt hours) |
|---|---|---|---|---|
| | 85% | 77% (turbine, generator & transmission combined) | 34 | 175000 |

State the length of depleted reach (in metres)

1275

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 m3/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 79111 19619 | 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. This pipe will be 6m long. It will be connected to an 83m long, 300mm diameter HDPE pipe which will run to Nant Helygog. At the end of the 300mm pipe, the water will enter a masonry headwall with a stilling well to reduce the water velocity before it is discharged back into the watercourse. Incorporated into the headwall structure there will be a screen, made using vertical steel flat bars spaced by 40mm. See the attached drawing 23030710.

## 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?

Yes

Submit a copy of the Planning Authority's response.

- File: 221025 Planning Authority's Pre-app response.pdf - Download

## 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

* 20/03/2023

Would you like a copy of your submission?

Yes

Your email address

greenbladeseng@gmail.com