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

Water Resources Act 1991, Environment Act 1995, The Water Resources (Abstraction and Impoundment) Regulations 2006, The Natural Resources Body for Wales (Functions) Order 2012

Cyfoeth Naturiol Cymru Natural Resources Wales

1. Application type

New full abstraction licence	☒	Give existing licence serial number and/ pre-application reference number
New temporary abstraction licence	☐	
New licence to transfer water	☐	PPN-00317 (pre-app), PPN-00375 (consent to investigate)
Renewal of a time-limited abstraction licence	☐	
Technical variation to an abstraction licence	☐	

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

25kW or less ☐ >25 to 50kW ☐ >50 to 100kW ☐ >100kW ☐

2. Linked licences

2.1 Does your proposal involve water rights trading?

No ☒ Yes ☐ If yes, provide licence serial number(s)

2.2 Is the licence (to be) aggregated with any other licences?

No ☒ Yes ☐ If yes, provide licence serial number(s)

3. Abstraction details

Provide details of all points of abstraction. Details of abstraction location(s) should correspond with any maps submitted.

If necessary, continue on a separate sheet and tick here to show that you have done this ☐

Abstraction location name / reference	Type (single point / reach)	National Grid Reference (12 digit)	If a reach, downstream National Grid Reference (12 digit)
Black Rock Farm ABH	Borehole (single point)	SJ 37452 47358	

4. Means of abstraction

Detail the structure and equipment involved in the abstraction process. If this information is detailed in a supporting document, provide the document reference. For groundwater abstractions, include borehole depth and diameter and provide details of screening and lining. If necessary, continue on a separate sheet and tick here to show that you have done this. ☐

Borehole 80 metres deep.
Drilled diameter: 300 mm (0 to 12 metres), 250 mm (12 to 80 metres)
Steel casing: 250 mm (0 to 12 metres)
Pvc plain casing: 150 mm (0 to 30 metres)
Pvc slotted casing: 150 mm (30 to 80 metres)
Annular backfill: grout 0 to 10 metres, gravel 10 to 80 metres

Abstraction by means of electric submersible pump

5. Abstraction quantities

Provide details of the abstraction quantities and periods proposed, including any deregulated abstractions (< 20 cubic metres per day) you currently have. Details of abstraction locations should correspond with any maps submitted.

Abstraction location name / reference	Purpose which water will be used for	Abstraction period (state 'all year' or give months)	Maximum annual abstraction volume (cubic metres)	Maximum daily abstraction volume (cubic metres)	Maximum hourly abstraction volume (cubic metres)	Number of hours of abstraction per day	Peak abstraction rate (litres per second)
Black Rock Farm ABH	Open-loop ground source heat pump system	All year	103,109	540	30	18	8.33
		Total	103,109	540	30		

6. Calculations and supporting information

Please provide further details of your intended use of water, including calculations in support of the quantities you have requested, your operational regime and any management agreements. See Guidance Note WRX for details of what is required. If your proposal involves the provision of a residual flow via a notch or orifice, provide information on how this has been calculated.
If necessary, continue on a separate sheet and tick here to show that you have done this. ☐

The abstraction is required to support an open-loop ground source heat pump (GSHP) system at Black Rock Farm. The GSHP system will be used to help regulate the temperature within a broiler poultry housing unit. The scheme is to be operated on a need basis, dependent on the difference between the required internal building temperature, and the temperature outside. This scheme has been calculated as typically requiring 4910 run hours of usage a year to allow for the needs of the building. The heat pump is likely to be run for a few hours at a time, and could be operated up to 18 hours a day to accommodate this.

The estimated run hours and loading percentages (based upon BS:EN14825) used to design the system are outlined in the table below.

Ambient temperature (oC)	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
No. of hours	1	25	23	24	27	68	91	89	165	173	240	280	320	357	356	303	330
Percentage loading	100	96	92	88	84.2	80.5	76.7	72.9	69.2	65.4	61.6	57.8	54	50.2	46.4	42.6	38.8
Volume required m3	50	48	46	44	42.12	40.23	38.35	36.46	34.58	32.69	30.81	28.92	27	25.1	23.2	21.3	19.4
Total seasonal volume (m3)	50	1200	1058	1056	1137	2736	3489	3245	5705	5655	7393	8098	8640	8961	8259	6454	6402

										Total	
Ambient temperature (oC)	7	8	9	10	11	12	13	14	15		
No. of hours	326	348	335	315	215	169	151	105	74	**4910**	**hrs**
Percentage loading	35	31	27	23	19	15	10	5	0		
Volume required m3	17.5	15.5	13.5	11.5	9.5	7.5	5	2.5	0		
Total seasonal volume (m3)	5705	5394	4523	3623	2043	1268	755	263	0	**103109**	**m3**

7. Industry-specific requirements

Complete the relevant table in line with the purpose of your proposal to demonstrate a justification of need for the quantities proposed. For uses not covered here or to provide further details, please use a separate sheet and tick here to show that you have done this ☐

7.1 For agricultural use:

Crop type	Soil type (for multiple soil types, indicate approximate split)	Maximum area of crop to be irrigated annually (hectares)	Maximum annual depth of irrigation to be applied (millimetres)
e.g. Carrots	*Silty clay*	*10*	*90*

Livestock type	Number of animals	Maximum daily quantity of water used (cubic metres)	Comments
e.g. Sheep	*200*	*0.005 per animal*	*Drinking water*
Provide details of any additional requirements (washing / cleaning)			

7.2 For golf course irrigation:

Feature	Maximum area to be irrigated daily (hectares)	Maximum depth of water to be applied daily (millimetres)
e.g. Greens	*0.9*	*220*
Tees		
Greens		
Fairways		
Others		

7.3 For industrial use:

Industry sector or process type	Water use per unit produced (state units)	Maximum units produced per year
e.g. Ice cream	*1.9 cubic metres per tonne of ice cream*	*10,000 tonnes*

7.4 For hydropower:
If you have submitted this information as part of your pre-application enquiry and no changes have been made to your proposal in the meantime, you are not required to provide these details again.

% abstraction and zone applied for (see HGN2)	Average gradient of depleted reach (%)	Catchment size above abstraction point (kilometres square d)	Net head between abstraction and discharge points (metres)
Turbine efficiency (%)	**System efficiency (%)**	**Maximum power output (kilowatts)**	**Annual capacity (kilowatt hours)**

State the length of depleted reach (in metres)

Provide the flow data (in cubic metres per second) & ratios specified below:	
Q95	
Q10	
Qmean	
What is the ratio of Q95:Qmean?	
What is the ratio of Q10:Qmean?	

Please send us a copy of the full flow duration curve for the site and confirm the method used to derive this. If you have used modelling software such as LowFlows, please provide us with a copy of the output (graph, data and catchment map) including the Long Term Average rainfall.

What low flow protection* do you propose to maintain in the depleted reach when the hydropower scheme is operating (in m^3/s)?
* Low flow protection is the flow rate above which abstraction can begin and is separate to the abstraction % take, see HGN2 for details.

8. Means of measurement

State how you intend to measure abstracted quantities at each abstraction point.
Meter ☒ Power Generated ☐ Other ☐
If other, please specify

9. Water efficiency

Describe all steps you have taken or intend to introduce to ensure efficient use of water, such as water storage, re-use or conservation provision. If necessary, continue on a separate sheet and tick here to show that you have done this. ☐

The GSHP system is non consumptive, abstracted water will be returned to ground by means of a reinjection borehole. The system will be subject to regular maintenance and checks to minimise leakage.

10. Fish and eel considerations (surface water abstractions only)

10.1 Confirm the fish species present at your site. If you are submitting a survey or report with your application, please tick here to show that you have done this. ☐

10.2 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.

	Intake	Outfall
Type of fish screen		
Screen aperture size (mm)		

11. Discharge details

11.1 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.

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)
Black Rock Farm RIBH	SJ 37462 47476	103,109 (annual)	Exemption being sought

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

Discharge via re-injection borehole (RIBH)
Borehole 85 metres deep.
Drilled diameter: 300 mm (0 to 18 metres), 250 mm (18 to 85 metres)
Steel casing: 250 mm (0 to 18 metres)
Pvc plain casing: 150 mm (0 to 30 metres)
Pvc slotted casing: 150 mm (30 to 85 metres)
Annular backfill: grout 0 to 20 metres, gravel 20 to 85 metres

12. 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.

Please refer to Hydrological Impact Appraisal, operation of closest abstraction, a small abstraction at Robinwood Activity Centre, is unlikely to be impacted to any significant degree.

13. Planning application

Have you sought advice on your planning application?

No ☒ Yes ☐

If yes, submit a copy of the Planning Authority's response.

14. Declaration

Please see Guidance Note WRX for details of who can sign this section and note the information in that document relating to the Data Protection Act 1998.

By signing below, you are declaring that as far as you know and believe the information given in this form, on any map and in any supporting or additional information, is true.

Signed	
Print name	Jennifer Young
Position	Senior Hydrogeologist
Date	November 3rd 2020

Application Checklist

Please tick the following checklist items to indicate that you have included the required information. If any sections of the form are left blank and no supporting

information submitted, where we have insufficient information to make a decision on your application, we will return your application to you.

Essential:

Form WRA completed ☒

Map showing applicant's land boundary with all abstraction and discharge point(s) clearly marked ☒

Evidence of negotiations of expected access rights, if applicable ☐

State number of continuation sheets (enter 0 if none included) [ ]

Where relevant:

Letter of authorisation from the applicant, allowing the agent to act as signatory ☒

Form WRE completed, if your proposal also requires an impoundment licence ☐

Further information requested in our pre-application response letter to you ☐

For hydropower applications, full flow duration curve for the site, confirmation of the method used to derive this and a copy of the output (graph, data and catchment map) including the Long Term Average rainfall, where available ☐

Planning Authority response, where available ☐

Additional supporting information - please list below:

Hydrogeological Impact Assessment
Pumping test data (Excel spreadsheet)