Dyffryn Crawnon Green Energy Micro Hydroelectric.

Abstraction Licence and Impoundment Licence Applications - Supplementary Information.

Document B: Design and construction statement.

This document provides information relating to Dyffryn Crawnon Green Energy's (DCGE) applications for abstraction licence and impoundment licence for a micro hydroelectric scheme on the Nant y Wenynen watercourse in the Dyffryn Crawnon valley near Llangynidr in Powys. All of the following documents should be read together:

- Completed Form WRA – NRW Provide Applicant Details and Proposal Outline.
- Completed Form WRD – NRW Application for a New Abstraction License.
- Completed Form WRE – NRW Application for a New Impoundment License.
- Document A: Covering Letter to NRW
- Document B: Design and construction statement. **THIS DOCUMENT.**
- Document C: Supplementary information for NRW Forms.
- Document D: Geomorphology photo survey.
- Document E: 2011 EA letter with relevant comments for 2026 applications.
- Document F: Rights of access lease.
- 09001/01/F Site plan and pre-2015 intake area (A3)
- 09001/02/F Existing post-2015 intake details (A3)
- 09001/03/G Existing turbine house and outfall (A3)
- 09001/06/A Proposed intake details (A3)
- 09001/07/A Document H: Extent of land access rights (A4)
- 09001/08/A Document E: OS map of site (A4)

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PREAMBLE.

Dyffryn Crawnon Green Energy CIC (DCGE) are applying to Natural Resources Wales (NRW) for a new abstraction licence and a new impoundment licence relating to an existing, but mothballed, micro hydroelectric scheme on the Nant-y-Wenynen watercourse in the Dyffryn Crawnon valley near Llangynidr in Powys.

Since 2015 DCGE operated the micro hydroelectric scheme as covered by the original abstraction licence WA/056/0038/001 and original impoundment licence WA/056/0038/002. The original 2012 licences were reissued on the 14th March 2013 to take into account a slight change in the position of the turbine house and outfall pipe (all other details remained the same).

For a variety of reasons, the 2012 and 2013 licences were held by TGVHydro Ltd. (the designers and builders of the scheme). TGVHydro Ltd ceased trading several years ago. During the winding up process for TGVHydro Ltd. the transfer of the above licences to DCGE did not take place. Towards the end of 2025 NRW became aware that TGVHydro had been wound up without transferring the licences. At this point NRW cancelled the original licences (back dated to February 2025).

The micro hydroelectric scheme is currently mothballed because there is no valid abstraction licence and there is no valid impoundment licence.

DCGE wish to continue to operate the scheme and are applying for new licences for the same basic scheme using the same installed structures, pipes and mechanical/electrical equipment (although abstraction regime, and thus intake, are to be amended to suit current NRW guidelines).

This design statement and construction method document has been produced as a supporting document for DCGE's applications for the new licences.

1) Overview of the scheme:

The project looks to recommission an existing micro hydroelectric scheme. The existing scheme consisted of the following elements:

- A mass concrete dam built across the stream with a central 1,000mm weir section.
- Below the intake weir section there was a stainless steel intake box with a screened top surface through which the allowed abstract water would pass. A hole in the base of the intake box allowed the hands off flow to pass.
- The abstracted water would travel through a pipe/penstock, down a hill and ultimately through a Turgo turbine linked to a 240v generator (located in the turbine house).
- After passing through the turbine the water was returned to the stream.
- Produced electricity was then exported to the grid via an electrical connection in an adjacent house.

The energy saved by having the water flowing through a smooth bored pipe rather than a rough bedded stream, is the energy that drove the turbine and the energy that was converted into electricity.

All of the existing works can be reused in their current as built condition. The only part of the existing works that requires changing relates to the intake (to accommodate a new abstraction regime).

The previous abstraction licence allowed for 100% abstraction above hands off flow up to the abstraction limit.

- The 100% abstraction was achieved by having a screened intake box that was the same width as the weir section built into the dam wall.
- The hands off flow was achieved via a calibrated hole in the bottom of the intake box.
    - During turbine operation the hands off flow hole was always below the water level in the intake box.
    - The flow through the turbine was controlled by a level sensor in the intake box.
    - The turbine controller always ensured that the water level never dropped below a setting known as Head Aim.
    - The flow through the hands off flow hole was calibrated/set when the driving head water level was at the Head Aim height.
    - If the turbine was off then it would only restart when the water level reached a setting known as Head Start level. Head Start was always above Head Aim. Due to this the driving head through the calibrated hole was always higher at start up. So the hands off flow would always be higher at start up and would settle down to the required hands off flow once the water level in the intake box settled down to the Head Aim point.

The current applications with NRW have follows the latest NRW abstraction guidance. For a Zone 3 minor upper catchment stream with a greater than 10% gradient the applied for abstraction is based on a Q95 hands off flow, Qmean peak abstraction and 70%/30% split of flows (with the 30% bypassing the intake box).

The works will allow a micro hydroelectric scheme to be brought back into operation. Over it's lifetime it will have a far greater positive impact on the environment compared to the very minor impact from the adjustment works at the intake.

2) Planning/Development Control:

The original micro hydroelectric scheme has planning approval from the Beacon Beacons National Park Authority (BBNPA). This planning approval continues to cover the restarted scheme. Planning reference number is: 12/08507/FUL, dated 5th February 2013. The proposed works on the intake are very minor at do not have an impact on the original planning approval.

3) Abstraction licence and impoundment licence:

Abstraction licence and impoundment licence are being applied for. The current applications with NRW have followed the latest NRW abstraction guidance. For a Zone 3 minor upper catchment stream with a greater than 10% gradient the applied for abstraction is based on a Q95 hands off flow, Qmean peak abstraction and 70%/30% split of flows (with the 30% bypassing the intake box).

Summaries of the actual anticipated abstraction flow and volume are referred to in form WRD and the corresponding supplementary information in ***Document C: Supplementary Information for NRW forms.***

As part of the 2011 pre-application for the previous licences the Environment Agency Wales (EAW, pre-dated formation of NRW) confirmed in a letter dated 4th July 2011 that:

- No fish easement works were required at the intake as no fish are expected to reach this part of the Nant-y-Wenynen watercourse.
- Screening on the outfall pipe (maximum 12mm mesh) would be required on the outfall pipe to prevent fish from accessing the turbine. This currently exists and will remain.
- Construction works should be limited to daylight hours to avoid disturbance to otters. This will be observed for the minor works required at the intake.
- The site was not significant for Crayfish and no action was required.

This letter is included in the applications as ***Document E: 2011 EA Letter with relevant comments for 2026 applications.***

4) Ordinary Watercourse Consent.

Powys County Council (PCC) issued an Ordinary Watercourse Consent For the original 2015 construction. Consent number LD027(P), issued 28/02/2013.
For minor works currently required for the minor changes to the intake weir an application has been made to Powys County Council for an Ordinary Watercourse Consent (OWC) to cover the minor works. It is anticipated that the OWC will be issued while NRW are considering the current licence applications.

5) Rights of access.

DCGE are not the landowners. DCGE have a lease with the landowner granting DCGE rights of access over a large area of land that encompasses the intake, the penstock line, the stream line and the outfall. Access to this land is from an adjacent public highway.

The Lease agreement and area of land are detailed in ***Document F: Rights of access lease*** and drawing ***09001/07A Extent of land access rights****.*

6) Description of proposed works

The only part of the existing works that requires changing relates to the intake (to accommodate a new abstraction regime).

To achieve the 70%/30% split of the weir section in the dam wall it is proposed to increase the existing 1,000mm wide weir (the width of the intake box screen) up to a width of 1,428mm. The 1000mm representing 70% (allowed abstraction) and the 428mm representing the 30% (bypass). This increase will be achieved by breaking out a 428mm long by 150mm deep by 100mm high section of the existing mass concrete dam wall.

During the above works the section of the dam wall being broken out will be isolated from the stream water flow by using clay and sand filled bags to divert water away from the immediate area of work. The breakout will therefore be carried out in the dry.

Once the additional weir width is formed 70% of the hands off flow will flow over the 1000mm section of weir (coming out of the lower hole of the intake box), and at the same time 30% of the hands off flow will pass over the 428mm section of weir (bypassing the intake box). Therefore, the flow through the hands off flow hole in the intake box will need to be recalibrated to 70% of the

hands off flow.

The recalibration will be achieved by using a 110mm pipe to catch the flow coming through the intake box 70% hands off flow hole. The flow will be timed as it is captured in a large container of known volume. The time to fill the container and the containers volume will be used to work out the flow and adjustments can then be made to the 70% hands off flow hole. The 70% hands off flow would be calibrated when the turbine was running and thus the level of the water in the intake box will be at the Head Aim point.

For works at the intake the following general approaches will be adopted:

- The works will be carried out in the summer months when stream flows will be very low.
- The works will be carried out between 09h00 and 17h00 to minimise disturbance to wildlife.
- Access to the works will be by 4x4 vehicle across fields and by foot down the slope to the intake.
- Generally, battery tools will be used to carry out the works. If a generator is used it will be a small petrol 'briefcase' type of generator located at least 20m from the water course. The generator will be checked off site to ensure that there is no dripping engine oil leakage. The generator will sit on plastic sheet. Filling of petrol into the generator will be carried out at least 20m away from the watercourse.
- The small volume (6 litres) of existing mass concrete wall being removed will be bagged up, removed from the area and disposed of in an appropriate manner.

It is anticipated that the works on the intake will take no more than five days for a team of two people.

7) Identification of hazards and Health & Safety

Key hazard and health and safety issues include, but are not limited to, the following:

- **Protective equipment:** All members of the workforce are required to wear hard hats, HiVis jackets/vests and steel toed safety boots. Other protective equipment will be used for specialist construction tasks as required.
- **Sloping ground:** Much of the construction site is sloping ground. Special care will be taken by the workforce when moving around site and transporting materials by hand. Particularly hazardous areas will be marked with hazard signs.
- **Power lines:** Overhead power cables span the fields to the west of the Nant. They are clearly visible and free from tree cover. They present a hazard to vehicle movements and so vehicle drivers will be briefed and shown the location of the power lines.
- **Stream channel:** Ground conditions in the channel are firm but uneven and combined with the steep slope form a significant hazard. Hazards will be cleared from the route and designed safe routes into the channel will be selected and appropriately marked.
- **Vehicle movements:** A vehicle will be moving across fields to and from the intake area. All workforce employees will be informed of the agreed access routes.
- **Livestock:** If present livestock will be removed from the immediate working areas.
- **Incidents:** Minor incidents will be recorded and working practices immediately reviewed to determine if risk can be further reduced. Major incidents will result in immediate halting of construction work and a full review of the incident.

- **COSHH:** Any substances that are hazardous to health will be handled with appropriate measures as indicated by the information label.
- **Condition of work site when not active:** Construction will be halted at night and at other times depending on the work program. All excavations will be either filled or clearly marked off if left open. Tools and materials will only be left in the marked storage areas. Hazardous materials will not be left on site. All appropriate warning signs will remain during construction pauses and all workforce safety controls will remain in force. Any open trenches will have planks of wood placed in them to enable species that fall in (e.g. hedgehog) a suitable means to exit.

8) Environmental protection

Key environmental protection issues include, but are not limited to, the following:

- **Mineral fuel engines and Fuel:** Fuelling with petrol of all power tools and generator will take place at least 20m away from water courses. Fuelling with diesel of all vehicles, power tools and generator will take place off site. All equipment will be daily checked for oil leaks.
- Static equipment will be positioned on plastic beds covered in sand.
- No fuel based power tools will be used in water courses.
- **Cement:** All cement mixing to form concrete will take place in the lower access field. Cement will be stored off site in a dry location at neighbouring property Cae'r Hendre. Sand/ballast will be stored under plastic sheets in the lower access field.
- **Water quality:** The stream will not be used for cleaning tools or materials. Construction will minimise release of sediment into the river. For mixing cement, water will be drawn from the stream using clean buckets. Hay bales will be placed downstream of the ford to filter sediments. They will be removed once construction is completed.
- **Protection of wildlife**: Design and construction has intended to limit disturbance to wildlife. Should protected species be encountered work will cease and advice sought from the Countryside Council for Wales.
- **Tree felling:** Any trees necessarily felled to facilitate access to the pipe route will be allowed to regrow. All material produced from felling will be stacked securely to form additional deadwood habitat.