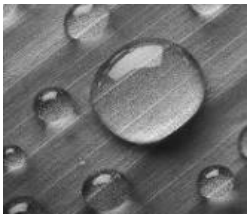

ELEMENTS ENERGY

Plas Farm Hydro Scheme

Ecology Report

March 2024

Hydropower Consultancy & Development

Document Control

Scheme Name: Plas Farm
Client Name: Richard Bowen

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1.1 Overview:

This project is a proposed 11 kW micro hydro scheme for the generation of electricity from a renewable source, water. The applicant is the landowner of the project. The applicant owns the farm and holiday cottages beside the powerhouse location and the electricity will be connected to this demand as well as the National Grid network. The applicant support efforts to address and seek solutions to climate change and is therefore making an effort to contribute towards National and regional requirements for clean energy. The applicant is also committed to environmental protection and is committed to minimising the impact of the project on the local ecology. This report outlines the survey of the existing site and it habitat types and conditions. Mitigation and methods for minimising the risk of potential environmental impacts from the operation of the hydro electric stating including its abstraction from the watercourse are evaluated and detailed. Measures to ensure the risk of potential impacts from construction are limited and these are set out and detailed within this report.

1.2 Overview of Development

The works will include:

- A small intake structure across the watercourse on the face of a waterfall, incorporating a Coanda screen with 1.3mm apertures and stilling chamber.
- A pipeline of HDPE plastic pipe (200mm outside dia.) running from the intake down to the turbine house on the West side of the watercourse. The pipeline is 600m long. The pipeline is mainly buried with the odd section overground where trees are present.
- A wood clad turbine house building with a pitched roof, enclosing the hydroelectric turbine, generator, and control panel.
- A 10m long, 225mm diameter discharge pipe with a screen with 25mm spacing, and an outfall, in the form of a mortared stone cascade, to return water to the beck at the rear of the powerhouse.
- A buried electrical cable from the turbine enclosure to the Cilybebyll Manor connection point.

1.3

1.4 Field Survey

Woodland & Trees

To the South of the development along the watercourse corridor is woodland. The species are a in the main a mix of comman ash, common beech, common hawthorn and hazel, with some oak and birch.

132m down from the intake is a patch of shrub and trees that the pipeline passes through. This area will have the pipe overground. The species of trees are a mix of Goat Willow, Comman ash, hazel, and common hawthorn.

Full details on the trees and woodland are available from the tree survey by Tree Check Arboriculture Ltd enclosed with the application. Mitigation and impact analysis is included within the survey and within the combined AIA & Method Statement.

Watercourse

The watercourse descends in an Westerly direction at a gradient of approximately 11% along its course from the proposed intake point over a rocky streambed for the majority of its length, with areas of exposed bedrock. The rocks and boulders are large enough in some locations to form a small number of falls (+2m). The length of the watercourse is in the main surrounded by woodland a thin stretch running along the watercourse with acid grassland to the South and North. The watercourse has not been assessed under the Water Framework Directive – River Basin Management Plan, but it is likely to be afforded more than moderate ecologically quality category.

4.1.2 Species

No evidence of Otter or Badget was noted during the survey visits but again it is accepted that this protected species is likely to utilise the area.

Along the watercourse no features likely to support otters will not be directly impacted by the proposed development, however it is acknowledged that any construction activity within or in proximity to the watercourse does have the potential to disturb otters moving through this stream corridor.

5.Impact Assessment

5.1Habitats

5.1.1 Woodland shrub & Trees

Figure 1 – Section of pipeline through woodland shrub and trees

Although the ground flora in the affected section of the woodland is limited due to the dense shade there is the potential for localised disturbance arising from repeated foot or machinery access to install the pipeline. Therefore, this short section of pipeline through the trees is to be dragged down into place using cables and winch minimising access to the woodland ground flora to minimal foot access. No machinery will enter the area.

5.1.2 Watercourse

It is recognised that the construction of the intake point will have a localised impact on the banks and bed of the watercourse. In addition there is the risk of silts being liberated into the water as a result of this disturbance, which may cause short-¬-term deterioration in water quality. It is similarly acknowledged that the installation of the discharge pipe and associated rock cascade will have a small scale direct impact on the affected bank. There is no risk of excavated material falling into the watercourse from the construction of the turbine house. In addition due to the fact that the concrete slab footing will be poured into an excavated depression there is no risk of concrete spillage into the watercourse.

The abstraction of water to power the hydro scheme will reduce the flow of water along a 'depleted' reach of 600 metres between the intake and discharge points. The reduction of water flows has the potential to have a localised impact on the aquatic environment and the identified features of local ecological interest, notably bryophytes and resident fish populations associated with the watercourse.

5.1.3 Acid and Base Rich Grassland

The shallow trenching of the pipe will have a localised, short term impact on the section of both acid and base rich grassland.

5.2 Species

5.2.2 Fish

There are a few existing natural barrier within the depleted reach, which are considered impassable to resident fish species and migratory species, including eels. The largest waterfall is the intake location itself with a 5m high near vertical fall. Given the number of waterfalls downstream of the proposed intake location and the expanse of exposed bedrock within the depleted reach the we do not consider the requirement for a fish easement is required at this scheme. During the construction of the intake and the discharge outfall there is the potential for localised small--scale releases of silt or other materials which could be detrimental to the aquatic environment, it is recognised that reduced water flows in the depleted reach has the potential to impact on the movement of aquatic environment at certain periods of the year.

5.2.3 Other Species

Otters

No features likely to support otters will be directly impacted by the proposed development, however it is acknowledged that any construction activity within or in proximity to the watercourse does have the potential to disturb otters moving through this stream corridor.

Bats & Birds

No trees with the potential to support roosting bats will be disturbed or removed as a consequence of the proposed development, nor will there be any direct impacts on their flight lines or foraging corridors. Similarly no trees with the potentially to support nesting birds will be removed.

6.0 Mitigation Proposals

This section details the specific measures proposed to mitigate those recognised impacts on habitats and species of identified ecological value. More general environmental protection will also be applied throughout the construction period, in accordance with the Construction Methodology document, which will provide an appropriate overall level of safeguard.

6.1.1 Woodland & Trees

The penstock route has been purposely located to avoid woodland and trees. Once section passes through trees and will be overground and dragged into place without machinery entry to the wooded area.

6.1.2 Watercourse

Protection of the watercourse habitat will be achieved through strict adherence to the environmental protection measures presented in the Construction Methodology Document. The discharge pipe outfall will be located and designed in accordance

with the Construction Methodology to minimise the risk of scouring of the stream banks and bed.

Adherence to the abstraction details decided by NRW as part of the abstraction licence will ensure that the watercourse is protected from the abstraction, with a hands of flow and a flow split appropriate for the watercourse to ensure a range of flows are present within the derogated reach and no abstraction at all during low flows (due to the hands off flow). This is physically guaranteed by the hands off flow notch in the weir sized as per the licence conditions.

6.1.3 Acid and Base Rich Grassland

Installation of the pipeline is to occur with the topsoil set aside and used during the landscaping back over the pipeline route, with the top soils not mixed or moved along the route, for example topsoil from one location returns back to that same location.

6.2.2 Otters

These species can be very sensitive to changes in light levels. The cover and depth of channel make this site suitable for occasional use by otters (*Lutra lutra*).

– ensure that working hours to commence one hour after sunrise and finish one hour before dusk to minimise the potential risk of disturbance to otters;

– any temporarily exposed open pipes will be capped in such a way as to prevent otters gaining access.

– if sections of trench are left open overnight, planks of wood will be placed at regular intervals to ensure otters or similarly any nocturnal mammals that may enter the trench can easily navigate their way out.

– the site will be cleared and all material stored appropriately on a daily basis as loose metal, plastic and food stuffs left on site can constitute a hazard.

6.2.3 Fish

There are existing natural barriers within the depleted reach, which are considered impassable to resident fish species and migratory species, including eels.
Giving the number of low height waterfall downstream of the proposed intake location and the expanse of exposed bedrock within the depleted reach we do not consider the requirement for a fish easement is required at this scheme. However to protect fisheries interests potentially present within the watercourse and elsewhere on the downstream river system:
screens will be fitted over the intake and discharge points of a maximum hole size of 3mm and 10mm respectively.

–preventing accidental release of cement, oils or other substances used during the construction process

– preventing bankside erosion by avoiding loss of vegetation and trees.

– works in the watercourse will be completed outside the typical fish spawning period

– the intake has been designed to allow the safe movement of fish through the intake structure

– HOF of Q95 and a 70/30% abstraction split flow to ensure a greater variation in flow regime throughout the depleted reach

6.2.4 Badgers

No badger sets were identified during the walk through survey.

However in the event that badger may be present on site the client is to ensure that the following practices are followed:

– All site users will be notified of site access routes for both vehicle and foot access to all elements of the build and storage areas.

– As storage areas are to be visited frequently throughout the construction,

– Any temporarily exposed open pipes will be capped in such a way as to prevent badgers gaining access.

6.2.5 Bats

The development site does not affect any trees or riparian treelines that may be a suitable location for roosting bats or a local bat flight line.

– ensure all construction will take place during daylight working hours (commencing no sooner than 1 hour after sunrise and ceasing one hour prior to sunset) to mitigate any residual effect of the proposed development.

6.2.7 Birds

Under the Wildlife and Countryside Act 1981 it is illegal to disturb nesting birds. To ensure compliance with this legislation, as outlined in the Design and Access Statement and Construction Method Statement.

The applicant will:
ensure that any tree and shrub felling that the development phase may have

will take place outside the bird breeding period (March -- September).

6.0 Enhancements

Elements Energy Ltd recognise the duties placed on public bodies to seek to halt the decline in biodiversity and the role of the NERC Act 2006 and the TAN5 guidance in encouraging developers to generate a net biodiversity gain as a consequence of their development proposals.

We are able to mitigate all of the impacts of the site and will remove all waste materials from the development area.

Our tree survey has picked up an Ash Tree with severe Ash dieback. This tree is to be felled down to the ground level as part of the works and will help to ensure reduced risk of disease spread.