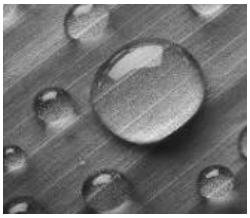

ELEMENTS ENERGY

Plas Farm Hydro Scheme

Method Statement

March 2024

Hydropower Consultancy & Development

Document Control

Scheme Name: Plas Farm
Client Name: Richard Bowen

Client Address: Cilybebyll, Swansea

Elements Energy Ltd Reference: **PFH**

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CONTENTS

1 Summary

This outline method statement (MS) describes the proposed activities required for the installation of a micro hydro scheme on the unnamed watercourse running down to Plas Farm, Cilybebyll.

The purpose of this document is, along with the accompanying Design and Access Statement, to enable planning, environmental and abstraction arrangements to be finalised. Once permissions are in place it will then form the basis of the Construction Phase Plan, with any revisions or modifications made as required.

2 General Description of Works

The layout is shown in the drawing Plas Farm General Layout RevA 27.02.24 and the works consist of the following:

- 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 (180mm 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.

3 Documentation

In addition to this document and the Design and Access Statement, the outline design is shown in the following drawings:

1. PFH -DWG-General Layout-A-040324-ARC
2. PFH-DWG-Intake-A-040324-ARC
3. PFH -DWG-Powerhouse-A-040324-ARC
4. PFH-DWG-Outfall-A-040324-ARC

4 Duration of Works

It is estimated that the works will take 4 months to complete. However, the weather could have a significant impact on the length of time required on site. The preferred approach for schemes of this scale is to hold back on construction during very wet periods in order to avoid degrading the working area.

5 Timing of the work

The intake works will take place during the summer (June-September) to ensure a dry patch of weather is found to have enable the works to be safe and straightforward. This also keeps the works outside of the fish migration periods.

6 Outline Method Statement

1	**Site Preparation**
1.1	Set up compound area including storage and welfare in the designated area
1.2	Install signage and fencing as required
1.3	Silt protection measures to be implemented
1.4	Consolidate access route for excavator to intake.
2	**Intake Construction** The intake is to be a Coanda screen intake. Work to install the intake will only commence when water levels are low and no heavy rain is forecast.
2.1	Use Ø375mm twin-wall pipe (or similar) with sandbags, visqueen and plastic sheeting to create a temporary diversion from natural stream crest upstream of works. The flow will be returned to the beck in a rocky section where the risk of the flow disturbing the river bed is minimal.
2.2	Place straw bales & terram downstream of works to catch any displaced sediment
2.3	Any remaining water below the diversion point will be pumped out and returned to the stream via a silt trap and/ or discharged over grass: whichever is necessary to ensure that no silt from the working area enters the watercourse.
2.4	If required, remove bedrock using heavy duty battery SDS chisel or pecker, attached to excavator, to form stable bedrock base for weir to sit on; depth of excavation will be commensurate with the integrated sump
2.7	Wire-brush bedrock to remove slime and allow good bond with concrete

2.8	Pour blinding layer/ sump base slab
2.9	Drill and chem-set steel rebar into base slab
2.10	Form timber shuttering around rebar to required dimensions/ design of weir wall
2.11	Prepare concrete on ply board laid on terram; to contain spillages this will be done on level ground away from riverbank within compound area.
2.12	Transport prepared concrete to weir
2.13	Cast weir NOTE - Check weather forecast and only proceed with placement of concrete if three clear dry days ahead – this is to prevent washout of works in spate flows.
2.14	Upstream of weir to be back filled to raise bed level to just below the coanda crest and residual flow notch.
2.15	All tools are to be washed in a specially dug pit away from the river.
2.16	Allow minimum three days for concrete to cure before removing any diversion works.
3	**Pipeline**
3.1	Deliver pipe to site
3.2	Place sections of pipe along route using winches within woodland and where pipe is buried in fields pipe can be moved around by excavator, tracked dumber or tractor.
3.3	Pipeline is to be installed in stages working up from the powerhouse
3.4	Most of the pipeline is through fields outside of the woodland. Here pipe is to be butt welded in to long strings and rolled into a pre prepared trench. Extent of pipe bedding dependant on ground conditions.
3.5	At bends, which will be formed by the natural flexibility of the pipe material, the pipe should be buried with at least 600mm cover to help restrain thrust forces. Particular attention should be paid to the outside of bends.
3.6	Pipe route through these fields is to have a soil strip with top soil set aside along the route. Trench is then dug and each string of pipe installed. Joining of strings can be done with electrofusion couplers.
3.7	Signal cable to be laid along pipe route. Cable to be covered in slit trench or similar
3.8	Pipeline in woodland is to be overground and pulled into place by an excavator outside of the woodland or bog area. No large machinery to enter the woodland or bog, hand tools only within these areas.

4	**Powerhouse** The powerhouse is designed around a concrete floor slab which underlies both the pipe and the turbine. The building will be of reinforced concrete & block work construction with larch timber facing and a pitched roof. The turbine will discharge into a concrete sump, with a tailrace made from 225mm twin-wall pipe or similar. Care will be taken to prevent runoff flushing excavated material into the watercourse.
4.1	Mark out powerhouse and tailrace
4.2	Excavate foundation trenches, sump and upper trench for tailrace
4.3	Cast wall footings and floor of sump
4.4	Install tailrace pipe
4.5	Construct formwork for sump around first section tailrace pipe, and formwork for turbine bed frame. Include anchor block, floor drain and cable ducts (as will be shown in engineering drawings)
4.6	Cast sump walls and main floor slab, with starter bars for anchor block. Slab to have slight fall to allow drainage into floor drain, and apron to slope away from building
4.7	Build up block walls, leaving cut-out for anchor block, and including ventilation notches at top and bottom of southern gable end
4.8	Fit wooden A-frames and rafters, clade with slate to complete the roof
4.9	Fit baffle boxes over ventilation notches
4.10	Fit doors and rainwater goods as appropriate
5	**Tailrace & outfall**
5.1	Use steel piles or sandbags/visqueen to form barrier around outfall to isolate works from watercourse
5.2	Dig remaining trench for tailrace pipe to watercourse
5.3	Install tailrace pipe
5.5	Fit Outfall screen (stainless steel with 30mm spacing)
5.6	Backfill pipe trench (selected backfill to avoid damage)
6	**Electro-mechanical installation**

6.1	Deliver turbine/generator, control panel and ancillaries to site, unload onto concrete apron and use rollers to move into powerhouse lifting area
6.2	Fit turbine and generator in place, align, bolt down and grout in
6.3	Fix main inlet valve support to concrete, and check alignment/ positioning of unit
7	**Connect & restrain pipe**
7.1	Pipe to be flushed with intake screen in place to remove debris from pipe (small stones etc.)
7.2	Cut pipe to length, and fit reducer with stub pipe to suit turbine inlet; reducer to be located within anchor block, at upstream end
7.3	Connect pipe to turbine inlet using VJ coupling or similar, ensuring 5-10mm gap between flange and end of pipe
7.4	Construct formwork for anchor block, fixing pipe securely to prevent suspension in concrete
7.5	Pour anchor block
7.6	Backfill around block
8	**Electrical Installation & Power Cabling**
8.1	Install control cabinet
8.2	Connect generator, actuator and sensor cables; install local power and lights
8.3	Connect signal cable from intake
8.6	DNO to complete installation of substation and HV cable within the substation room of the powerhouse.
8.7	Powerhouse fuses to be fitted by DNO following electrical installation
8.8	Warning tape to be placed in trench; cover depth and other details to be specified by DNO
8.9	Install intake level sensor(s) under intake screen
9	**Final civils, making good**
9.1	Stone face powerhouse
9.2	Final pumping out and clearing of working area prior to removal of diversions; all silt water to be pumped out of working area
9.3	Remove waste and excess materials

9.5	Remove sediment from any traps; fill and reinstate turf
10	**Commissioning**
10.1	System commissioning as per turbine supplier instructions