

HYDRO POWER CELYNOG ISAF

**CONSTRUCTION METHOD STATEMENT
ENVIRONMENTAL MANAGEMENT PLAN**

&

RESTORATION PLAN

(INCORPORATING TREE PROTECTION STATEMENT)

Prepared by GRC

Gwyn Roberts Construction a'i Fab

November 2018

Celynog Isaf Hydro

Construction Method Statement **Planning reference NP5-54-565**

Introduction

This Construction and Restoration Method Statement describes the proposed activities required for the installation of a 100 kW hydro using the waters of Afon Celynog watercourse and includes the procedures required to safeguard the environment during the construction phase.

General Description of Works

The scheme makes use of water available in the river known as Afon Celynog within the Snowdonia National Park. The installation would be capable of producing a maximum electrical output of 100kW and is projected to provide around 260,000kwh per year of renewable electricity (equivalent to the consumption of 65 UK average homes) and saving 95 tonnes/year of CO₂ emissions from UK coal-fired power stations.

As part of the planning application from the Snowdonia National Park and the Abstraction licence from Natural Resources Wales, ecological surveys had to be carried out to determine the impacts of the scheme on the ecology of both the penstock route, together with the intake weir and the turbine house. We will follow the recommendations made in the study and survey.

The works consists of the following

- Installation of Coanda screen and integrated intake chamber unit onto stream bed
- Construction of stone faced retaining walls
- Buried electro-fusion welded polyethylene pipeline
- Powerhouse with concrete floor slab and external pipe anchor block, clad in timber and turf roof.
- Turbine/ generator set
- Twin wall plastic discharge pipe (tailrace) to feed water back to the watercourse.
- Cabling to intake pressure sensor for automatic control (along penstock route)
- Buried power cabling to pole mounted transformer
- Network Operator fuses and metering inside metering cubicle.

The intake will be built in the stream bed, during this construction phase close attention will be paid to mitigating the specific risks to the environment.

Duration of Works

It is estimated that the works will take up to four months to complete. However the weather of course will have significant impact on the length of time the works will take to complete. We do

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tend to steer away from sites during wet weather on order to limit damage to the construction areas. Care is taken to ensure that the footprint of the works is minimised.

METHOD STATEMENT

Site Preparation – Set up the compound areas including storage and welfare in the designated areas

Install signage and fencing as required

Check all overhead and underground cables. The site will be CAT tested. There is an overhead cable near pipeline route this will, be assessed and if needed goalposts will be used.

Consolidate temporary and permanent access routes, allowing enough room for 2.5m width excavator.

Works include - The penstock route

Intake works – temporary and permanent

Powerhouse

The Project Manager for the construction phase will keep accurate records of environmental monitoring. Pollution prevention methods will be implemented on an on-going basis and ensure that both land-based and watercourse protection measures are adequate and properly maintained.

This document includes the steps that will be taken to avoid any pollution incident however if a pollution incident occurs we will contact NRW immediately on 0800 807060. Immediate remedial action will include stopping construction works and reinforcing all measures in place to prevent pollution as outlined below.

3. Environmental Management Plan

Areas of the environmental impact that are relevant to the proposed works includes contamination of the river with concrete, silt, oil or fuel spillages and disposal of waste (both solid and liquid). Specific risks associated with these areas, together with mitigation procedures to minimise or eliminate these risks are outlined in the following sections.

The following relevant EA guidelines will be followed

PPG 01 General Guide to the Prevention of Pollution

PPG 05 Works in near or liable to affect watercourses

PPG 06 Working at construction and demolition sites

All materials and equipment for the scheme will be stored in the temporary construction compound areas located adjacent to the turbine house and intake locations.

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It is estimated that the works will take up to four months to complete. However the weather could have significant impact on the length of time required on site. Our preferred approach is to hold back on construction work during wet periods in order to limit damage to the working area.

4. Construction Method Statement

General

Compound areas will be set out

Bog mats and boards will be used to protect the habitat if needed

The land in question is private property but signage and fencing will be installed as needed

Any potential drainage points from workings to watercourse will be blocked with straw bales or terram as necessary.

Intake works

Prepare access track

Place straw bales downstream to catch any displaced sediments

Install a temporary bund across half of the stream using sand bags, diverting the flow to the other side. This will provide dry and sustainable working conditions.

Complete concrete works for intake structure – build up foundation slab, screen mountings and wing walls. Allow minimum of three days for concrete to cure before removing bypass pipes. Also, we will keep an eye on weather predictions as it is important to have three clear days for concrete pouring. The intake weir will be of a standard design. We will use natural stone to current exposed concrete on the weir abutments

Remove shuttering

The process will be repeated to allow construction of the remaining half of the weir.

Install bar screen and remove debris off site – Leave site clean. Remove all bunding

At the intake works silt curtain traps will be used in nets where any works may lead to silt entering wet areas or small watercourses/ ditches.

Prior to any stonework commencing on site, a trial stonework panel including pointing not less than 2.00m² shall be constructed and the trial panel inspected and approved in writing by Local Planning Authority.

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Penstock pipeline

Penstock pipe route is located between the intake and turbine house and runs mainly through open farmland which is very straightforward. At the intake and powerhouse, and a short section mid way between the two, the pipe line will run through an ancient woodland. The pipe route has been designed to minimise the impact on the wooded areas and tree protection measures have been included.

Penstock in open fields

Topsoil will be stripped for the length of the pipeline and stored adjacent to pipe route on upper side of the route to contain run off. The trench depth will be variable depending on ground conditions and done with a 700mm wide bucket. 5m working corridor required and working completed with

Boulders will be removed and kept on side of trench.

A thick walled HPPE pipe (known as PE100) that is both robust and flexible will be used and this has significantly reduced trenching requirements. (The appropriate size of the pipe for this design flow would be 560mm external diameter).

The pipe will be supplied in 6m or 12m lengths and fused together on site using specialist butt-welding equipment. They will be welded in 50m sections and carried using tracked machines into the trench. The pipeline will need to be buried with a minimum cover of 0.6m through the fields to protect the pipe from freezing and from farm machinery. The gentle curvature of the pipe route indicates that the only essential thrust block will be at the bottom end of the pipe, as part of the powerhouse construction. The pipe-run has been estimated from map measurements to be 380m in length. The pressure rating will need to increase as the pipe progresses downhill.

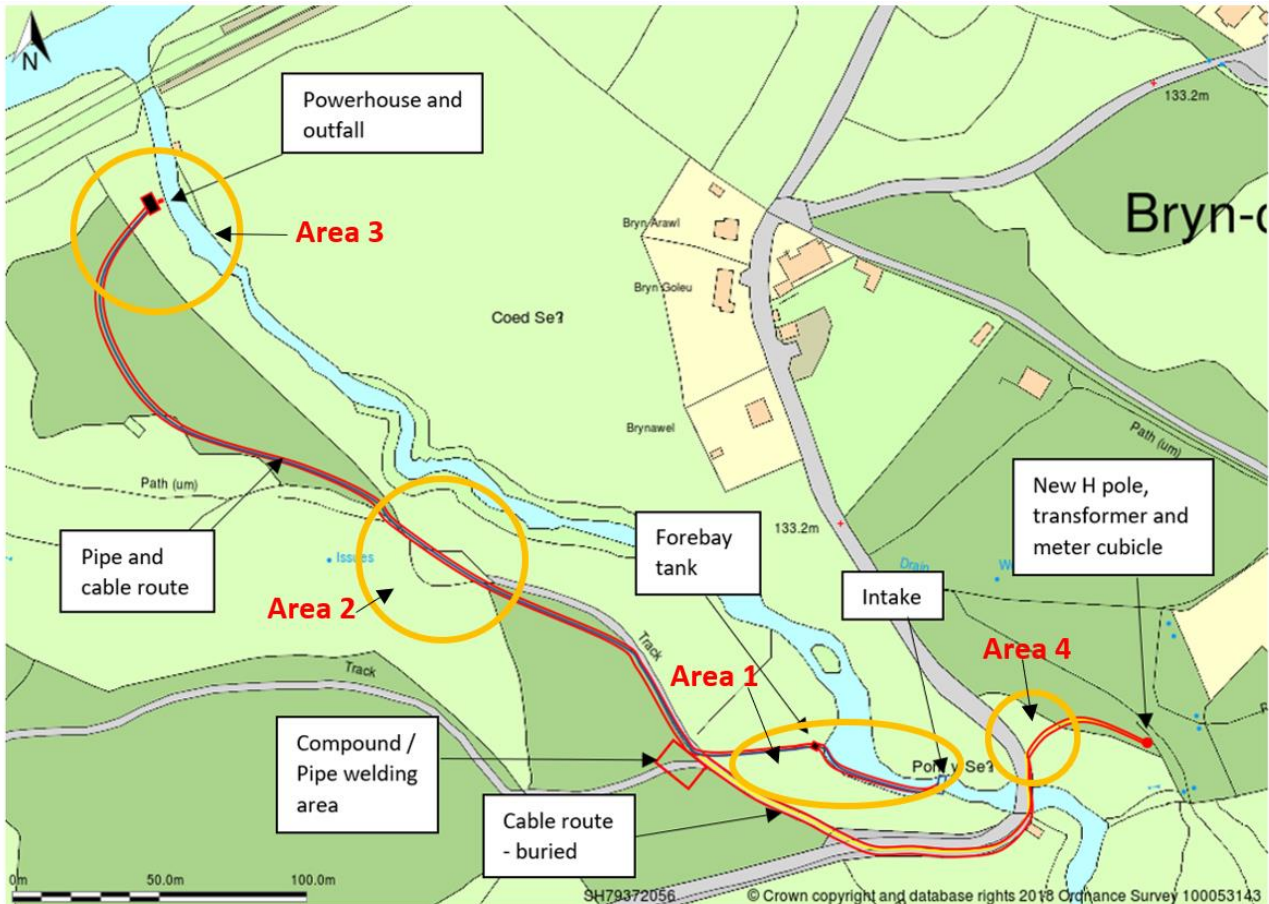
Sections of the pipe to be welded together using butt welding or electro fusion joints at the welding stations (in 50m sections and backfilled immediately to minimise the amount of open trench at any one time). Then dragged along the pipe route and laid into trench and reinstated over as appropriate – unless construction uncovers any sharp or big grain rock, no pipe bedding materials will be required. We will be backfilling with a riddle bucket and reinstated with the topsoil.

Where necessary any reinstated areas will be fenced off using temp stock proof fencing such as electric fencing etc if livestock are present.

Penstock in Ancient Woodland

Map 1 shows the 4 areas (circled in orange) of woodland that will be impacted by the scheme.

Map 1.



Penstock at Intake area (Area 1)

There will be a 5-meter working corridor in the woodland and this will be marked out with orange barrier fencing.

The required plant will be 8-tonne machinery and 6-tonne track dumper with 600-700mm bucket for trenching

The top soil will be stripped and stored outside the wooded area and also the spoil from the trench will be stored outside to minimise impact on this area.

Block plan 1 and table 1 identifies the trees impacted with mitigation measures.

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Block Plan 1

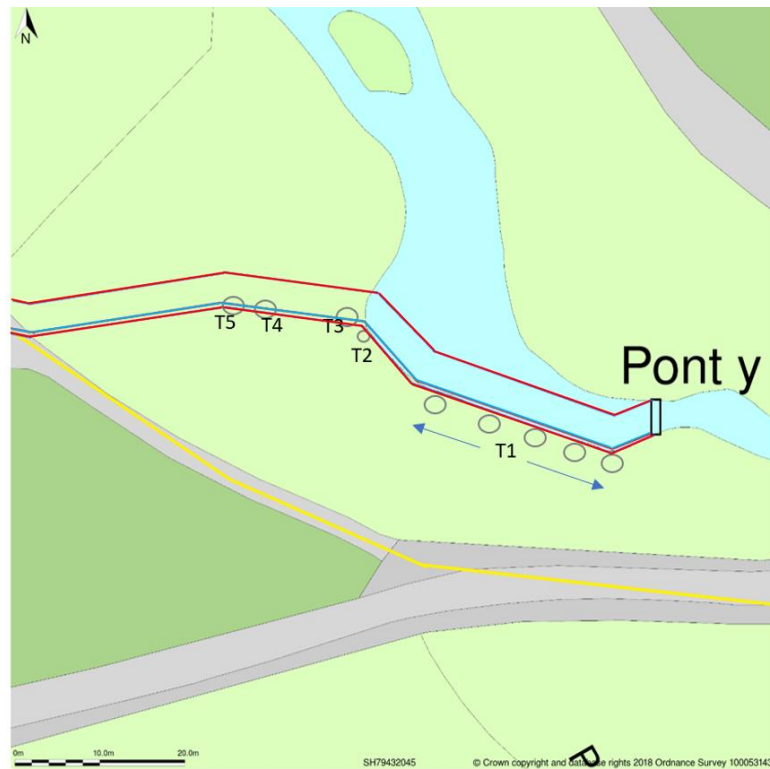


Table 1

T1	5 non-native Beech trees are overhanging the river and are to be removed
T2	Hazel to be coppiced
T3	Hazel (to be retained through transplanting the root plate – new location to be dug prior to transplanting. Tree transferred immediately to new location and roots covered) (forebay tank location)
T4	Hazel (to be retained through transplanting the root plate – new location to be dug prior to transplanting. Tree transferred immediately to new location and roots covered)
T5	Ash (to be retained through transplanting the root plate – new location to be dug prior to transplanting. Tree transferred immediately to new location and roots covered)

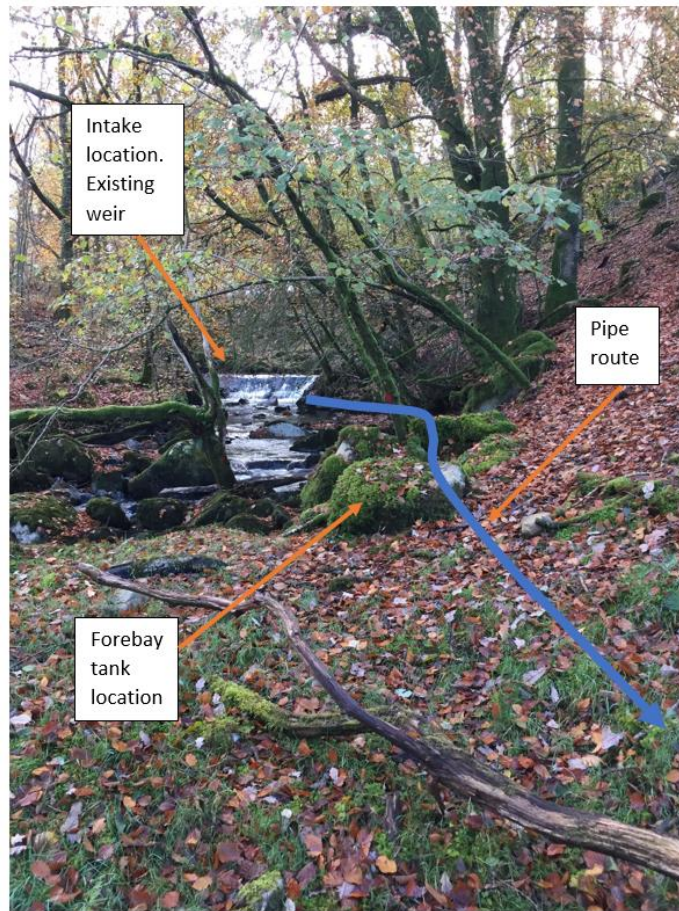
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Photo 1 – Area 1



Penstock at the mid section (Area 2)

There will be a 5-meter working corridor in the woodland and this will be marked out with orange barrier fencing.

The required plant will be 7-tonne machinery with 600-700mm bucket for trenching. The pipe will be shallow buried 300mm for a length of 23m through this area and covered with re-claimed material.

Block plan 2 and table 2 identifies the trees impacted with mitigation measures.

Block Plan 2



Table 2

T6	Various Hazel, Ash and Alder in good to fair condition. All to be retained.
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Photo 2 – Area 2 – pipe route in existing opening through wooded area



Penstock at the powerhouse area (Area 3)

Temporary access will be required into the woodland to construct the powerhouse (cut and bench).

Orange barrier fencing to mark out 5m corridor for temporary access and 8-tonne machinery to be used.

Pipe will be in a shallow trench for final 12m into the powerhouse with a working corridor of 2.5m and 3.5 tonne machinery to be used. Dug material will be used to cover the pipe. Orange barrier fencing to be used to mark out 2.5m corridor into the woodland.

Block plan 3 and table 3 identifies the trees impacted with mitigation measures.

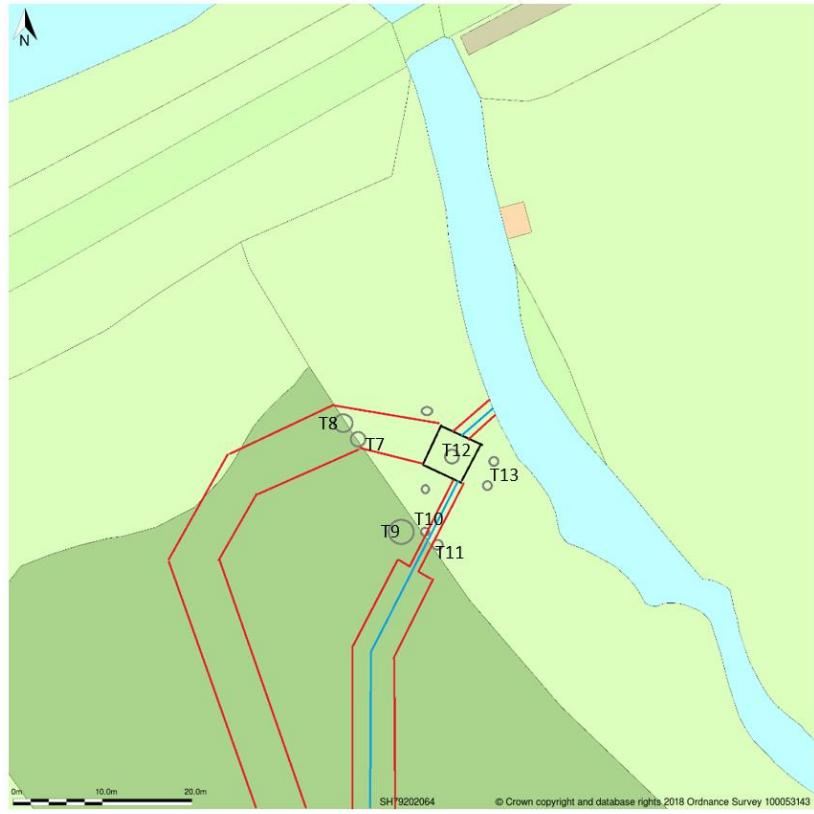
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Block Plan 3



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Table 3

T7	Birch (to be removed – condition dead - photo X)
T8	Birch (to be removed – condition dead - photo X)
T9	Birch (to be retained)
T10	Hazel (to be retained - coppiced)
T11	Rowan (to be retained - coppiced)
T12	Willow (to be removed – condition dead – photo X)
T13	Hazel trees of various sizes and condition (to be retained – coppiced)

Photo 3 – Intake location



Cable route (Area 4)

Between trees T14 and T16 a working corridor of 2.5 m will be marked out with orange barrier fencing. An Ash tree in poor condition will be removed and the cable will be buried in a 200mm wide trench.

Block plan 4 and table 4 identifies the trees impacted with mitigation measures.

Block Plan 4

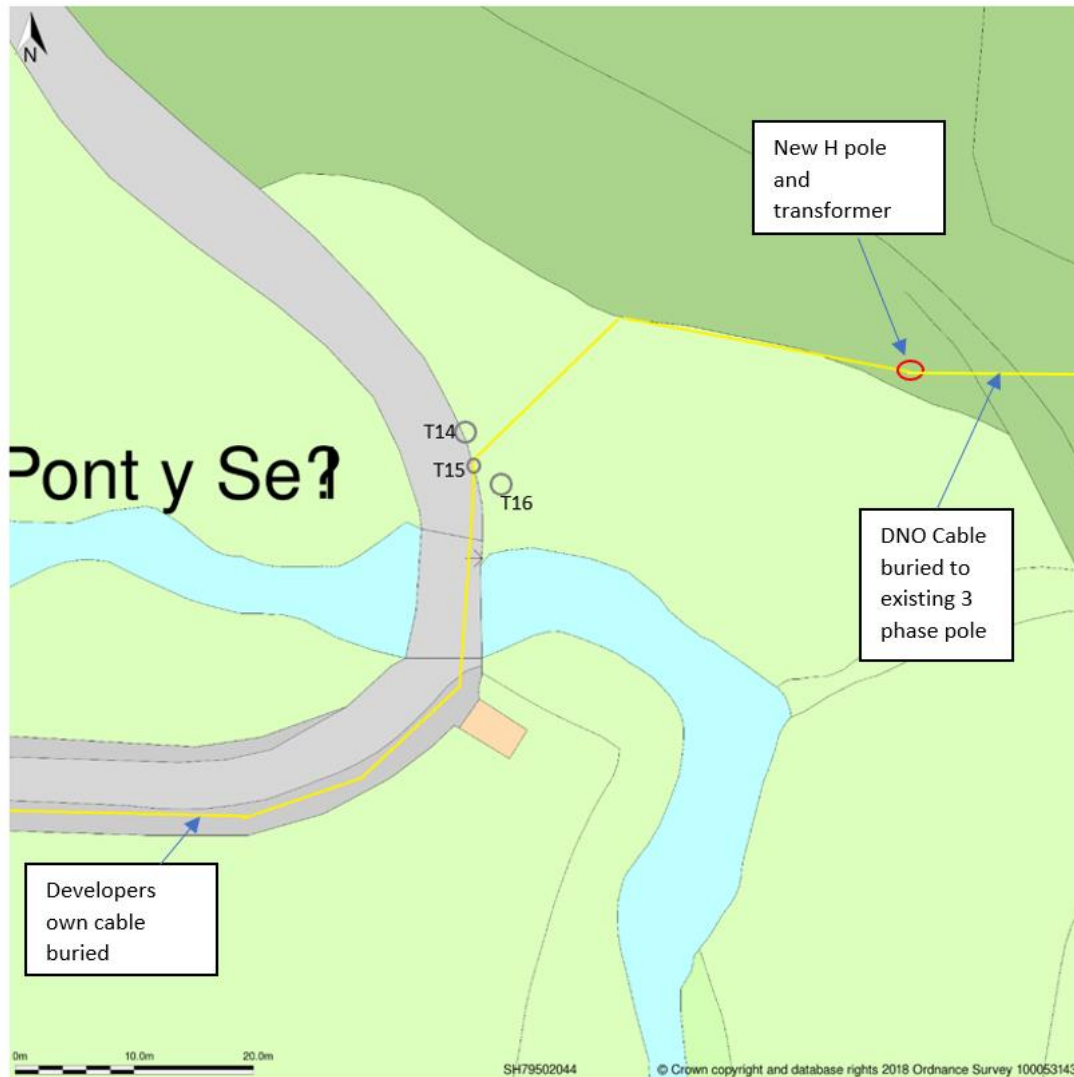


Table 4

T14	Oak in good condition to be protected. Two of the lower branches to be cut back.
T15	Ash in poor condition and growing on top of a stone wall to be removed.
T16	Oak in good condition to be protected. Three of the lower branches to be cut back.

Photo 4 – cable route



Power house construction

The powerhouse will effectively be a new stand-alone building. The building will be 4.5 meters by 4.5 meters to accommodate the turbine, pipework, generator and control panel. The powerhouse will require foundations and reinforced concrete floor.

On severe weather we will ensure at all times that the river has been guarded to ensure no pollution enters the watercourse.

Build up block-work walls

Install doors

Finishing and landscaping

The turbine hut is to provide sound attenuation against internal generated noise to a standard that causes no reasonable loss of amenity to the residents of nearby properties

Electrical connection

Lay steel armoured power cable (5 core 50mm) power cable plus separate 50mm earth cable in the same trench as the pipeline for approx. 380m. A further trench will be required in an existing track and the side of the road (including one section in the road) to the new metering cubicle. A traffic management plan will be presented before construction begins and the work can be completed without the need for a temporary diversion.

As part of the planning application no construction plant and machinery shall be operated outside the following hours:

Monday to Friday 08.00 – 18.00

Saturday 08.00-13.00

No construction plant or machinery will be operated on Sunday or Bank or Public holidays (except for works of an emergency nature)

The designated public right of way will remain unobstructed whilst the works are carried out and care will be taken to ensure that there are no hazards during the works

Concrete

Concrete leaked into the river has the potential to kill fish. Care will be taken at all stages of the work to prevent concrete entering the watercourse.

Silt

Not as harmful as concrete but it can have an adverse affect on the river environment. All efforts will be made to prevent silt entering the watercourse including the use of straw bales downstream to collect disturbed silt. All, run offs will be diverted away from the watercourse.

Fuel and Oil

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Fuel will be stored in bunded tanks and drip trays and spill kits will be located in case they are needed.

Restoration Plan

The river banks, pipeline route and surrounding areas will be reinstated as appropriate to restore their pre-works condition according to location. Generally ground to be reinstated as far as reasonable practical to same standard and condition as prior to construction.

In summary the following measures will be taken to ensure that the site is reinstated as far as reasonably practical to the same standard and condition prior to construction

- i. Use of low ground pressure extra wide tracked excavators and bog mats in sensitive and wet areas to avoid damage and reduce the need for reinstatement.
- ii. Working corridor kept to a minimum
- iii. Excavation/trenches kept to a minimum width and depth
- iv. Pipe welded in long sections and dragged into place whilst trench is excavated.
- v. Excavations backfilled and reinstated as soon as reasonably practical
- vi. Works carried out in dry weather conditions where possible
- vii. Utilising existing tracks and the pipe route for access to avoid unnecessary encroachment into other areas
- viii. If livestock is present, temporary stock proof fencing such as electric fencing will be used to protect the works.

Health & Safety

We at GRC – Gwyn Roberts Construction a'i Fab are committed to providing a quality service in a manner that ensures a safe and healthy workplace and minimises our potential impact on the environment.

We will operate in compliance with all relevant environmental legislation and we will strive to use pollution prevention and environmental best practices in all we do.

We will integrate the consideration of environmental concerns and impacts into all of our decision making and activities, promote environmental awareness among our employees and encourage them to work in an environmentally responsible manner, train, educate and inform our employees about environmental issues that may affect their work. We will reduce waste through re-use and recycling and by purchasing recycled, recyclable or re-furnished products and materials where these alternatives are available, economical and suitable, and promote efficient use of materials and resources throughout our facility including water, electricity, raw materials and other resources, particularly those that are non-renewable, and avoid unnecessary use of hazardous materials and products, seek substitutions when feasible, and take all reasonable steps to protect human health and the environment when such materials must be used, stored and disposed of.

We will purchase and use environmentally responsible products accordingly and develop and maintain appropriate emergency and spill response programmes.

We will communicate our environmental commitment to clients, customers and the public and encourage them to support it, and we will also communicate with Environment and Planning officials to strive and to ensure a safe and healthy workplace.

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