Merkland Burn Hydroelectric Scheme Construction and Environmental Method Statement

Produced by: [redacted] – Project manager.

Site Entrance A: NS 01697 39102 Site Entrance B: NS 02098 39426

Intake Location: NS 01314 39701

Material Laydown Area: NS 01679 39109

Turbine House: NS 02140 38554

Outfall: NS 02148 38559

Contents

Version Amendments

1.0 - Overview

This document describes the methodology which will be utilised to construct:

- One reinforced concrete intakend associated flow compensation.
- A 355mm HDPE Penstock from intake to the turbine house.
- The turbine house and outfall.

Along with all environmental mitigation measures such as silt mitigation and watercourse diversion.

Please refer to the site plan appended to this document for further detail on the location of areas, structures and mitigations referred to in this document.

2.0 - Pollution Mitigation and Control Measures

- All operatives and site visitors will be made aware of the need to protect watercourses and sensitive areas identified by environmental surveys. Extreme care will be taken to prevent pollution and the mobilisation of silt and sediment.
- All operatives and site visitors will be informed that it is imperative that works are to be carried out in accordance with the principals within SEPA's Guidelines on Above Ground Oil Storage Tanks and Working in Watercourses (GPP2 and GPP5). Minimum necessary fuel to be stored on site in line with GPP guidance and in laydown areas. Any construction plant with fuel tanks or lubricant reservoirs will be bunded and stored in the material laydown area when not in use. All vehicles will carry spillage mats and drip trays as well as emergency spill kits.
- All current and relevant PPG and once replaced, GPP guidance will be strictly adhered to and any future changes adopted.
- All material laydown areas are located at least 10m away from the nearest watercourse.
- GPP2 will be strictly followed with regard to mobile plant with self-contained fuel tanks.
- Refuelling will take place in the laydown area on an impermeable bunded membrane. Fuel will be brought to the site in towable bunded bowsers or by a certified fuel supply contractor.
- Chemicals and oils will be stored in the laydown area in bunded containers.
- Pollution spill kits will be stored on site. At least one kit will always be kept in the laydown area, with any plant and at the intake locations.
- Any contaminated soils will be placed in a designated storage bin immediately and removed by a licensed carrier at the earliest opportunity.
- General waste and recycling Bins will be provided by a licensed contractor for construction waste and emptied regularly by a licensed carrier.

- Abundant *Terrastop™* and straw bales will be kept onsite to resolve any unforeseen incidents or mitigation requirements.

- The manager will regularly carry out daily visual checks of watercourses and if any silt runoff is evident the source of the problem will be addressed immediately.

- If pumping is required care will be taken in pump sizing and pump inlets will be screened. Water will be discharged away from watercourses and via a geotextile filter and silt trap to prevent silt and debris entering any watercourses. If pumping, e.g. when de-watering a trench, the pump outlet will be at least 10m from the nearest watercourse and moved regularly to prevent ground saturation. Silt barriers will be erected. Any watercourse which lies downhill of pumping operations will be regularly checked for sediment transfer which may result from the activity.
- Cementitious materials will not be placed in water. Any cement stored onsite will be in sealed waterproof packaging. Any part used bags will be placed in a sealed skip (supplied by a licensed provider) after use and removed by a licensed carrier at regular intervals.
- Cleaning of tools will be carried out in designated washout pits within the bunded material storage area.
- If heavy rain is expected concrete will not be poured and materials harmful to the environment will be removed to the laydown area. Therefore, we do not expect to have any surface runoff from wet concrete sections or cementitious material. Trenching activities will also cease and trenches will be closed where possible. If a trench cannot be closed silt mitigation procedures will be used to prevent the risk of any sediment being transported from the trench into the environment.
- Excavated materials will be stored in accordance with good practice guidelines and in accordance with this document's turf management strategy.

3.0 - General Construction Procedures

The site manager will inspect all working areas each day to ensure that work is being carried out according to this document and that risk to the health and safety of the workforce and public is as low as reasonably practicable. They will also ensure that environmental mitigations are in place and functioning effectively i.e. that silt barriers are not leaning or sagging and that silt traps are functioning correctly.

The site manager will consult regularly with the site staff regarding the implementation of the contractor's health and safety plan.

Warning signs will be put in place as per the access management document.

Any material which requires a COSHH assessment and machinery, when not in use, will be properly secured from any member of the public who may inadvertently access the site or purposefully ignore boundaries and signage.

No person shall be allowed to enter any area of the site without having been through a site induction. The site will check signage and fencing at the start of the working day. Signage and welfare equipment will comply with CDM regulations.

All construction plant and equipment will be regularly inspected and maintained to statutory and manufacturer specifications.

Any plant and machinery that will be operated within 10m of a watercourse will be checked for fuel and lubricant leaks prior to operating each day, after every 4 hours of operation and before crossing any watercourse. Any leaks shall be immediately remedied/the plant removed from site. If immediate removal is impossible the plant will be placed on a drip tray. Only competent and trained persons shall operate plant.

Plant and machinery will only be refuelled on prefabricated drip trays at the refuelling points in the laydown area. All vehicles and plant must be checked by drivers before use and secured afterwards.

The site manager will inspect weather forecasts, actual weather conditions and ground conditions before and during excavations to ensure working conditions are safe. No river-related construction activities will take place in high flow conditions. Works will take place when the flow rates in the river is below the bypass's maximum flow and falling with no rainfall predicted for 24 hours.

In the event of unexpected adverse weather conditions i.e. periods of heavy precipitation, the site will determine which, if any active operations shall be permitted to continue.

The site

SEPAs guidance on "Engineering in the water environment good practice guide – Temporary Construction Methods" will be referenced and adhered to when working in or alongside watercourses. Particularly sections 3.3, 3.4, 3.6 and 3.8.

3.1 - Preconstruction Pollution and Environmental Harm Mitigation

Before construction activities commence and prior to any materials or plant being transported to the site, a series of measures will be put in place to mitigate against environmental harm. *Terrastop™* silt fence will be used to prevent silt from entering watercourses across the site.

The material storage areas will be constructed at the points shown in the relevant site maps. A silt barrier fence will encircle the material storage zones to prevent cement, ballast, or sand from being transported in surface runoff into local watercourses during periods of high rainfall or accidental spillage. Drip trays and bunded areas will be put in place in the laydown area prior to the delivery of any plant containing fuel or oil.

Silt barriers will be erected between any planned trenching or construction activities come within 10m of any watercourse/drainage ditch

Concrete washout pits in the laydown area will be installed and where necessary bunded with soil to prevent runoff into water courses.

3.12 - Protection of Sensitive Habitats/Species

An extended phase 1 habitat study has been carried out by Naturally Wild in 2022. Pre-construction mammal and nesting bird surveys will be carried out prior to construction commencing.

1. Badgers have been recorded within 1km of the construction site but no signs the presence of badgers in order around the construction site was found during Naturally Wild's survey.

Site workers will be informed of the protected nature of badgers. If any presence of badgers are found on site, the ECoW will be informed immediately and action taken if needed.

2. The site consists of mature plantation, clear felled plantation and semi-natural woodland.
3. No bat PRF's were identified within the construction area.
4. A buzzard nest is located at NS 01378 39516. This is located ~30m outside of the construction area. During the 2022 habitat survey, this nest was in use but it was not determined if it was being used as a nest or roost site. The site was not in use during 2024.

No work or transit will take place within 100m of the buzzard nest during the nesting season, unless the nest has been assessed to be inactive by the ECoW.

5. No Ground Water Dependent Terrestrial Ecosystems were found on the site.
6. No signs of otter were recorded during the survey, but otters have previously been recorded within 1km of the construction site.

Site workers will be informed of the protected nature of otters. If any presence of otters are found on site, the ECoW will be informed immediately and action taken if needed.

7. Rhododendron Ponticum has present in some areas of the site.

Rhododendron's will be cleared by an INNS management contractor prior to work commencing. During construction, workers will implement the INNS management plan.

Any exposed pipe systems must be capped when not in use and exit ramps are to be installed along any exposed trenches or holes (to prevent animals from entering and becoming trapped). All construction works must be carried out in accordance with SEPA's Guidance for Pollution Prevention 5 (GPP 5): Works and maintenance in or near water.

A bryophyte survey was carried out by [redacted] in 2022 on behalf of Naturally Wild. The survey found two target species bryophytes, giving the depleted reach a bryophyte score of 2 (Category C). The survey also found on Trichomanes Speciosum (Killarney Fern) in its gametophyte stage at one location (NS 01973 38858) within the depleted reach.

The Killarney Fern will be protected in line with the 'Merkland Burn Micro-Hydro – Outline Species Protection Plant for the Killarney Fern' which was agreed between the developer and NatureScot in April 2023.

3.2 - Site Access

See traffic management plan.

3.3 - Material Transportation and Storage

Materials and plant will be brought onto site after all environmental mitigations are in place. All materials for construction will be stored in the laydown area. Designated storage areas for the powerhouse and intakes will not be formed, as the quantity of materials required is very low. Materials will be brought to these structures as needed and used straight away. After delivery to the laydown area, pipes will be fused into 120m lengths alongside the laydown area and pulled into position by a tracked vehicle.

It is estimated that 8 HGV deliveries, 6 LGV deliveries and 4 heavy plant deliveries (drop of and collection) will be required to deliver all materials and plant necessary to complete the development.

All materials will be stored in their predesignated bunded cordons.

All hand and portable tools will be removed from the site at the end of each day or locked in a safe storage unit in the laydown areas.

We expect material and plant deliveries to have a negligible impact on access road capacities.

3.4 – Site Clearance

Much of the construction area Is currently inaccessible to tracked vehicles. Trees and tree stumps must be removed to facilitate access to the intake and powerhouse areas, as well as much of the penstock route.

Clearance will broadly take place in three areas. These are:

- The standing plantation in the North West corner of the site.
- The area of clear-felled forestry in the centre of the site.
- The semi-natural woodland in the South East of the site.

Plant requirements are:

- 1 x timber harvester
- 1 x timber forwarder
- 1 x tracked 13t excavator
- Hand-held chainsaws

3.41 – Clearance Methodology

Before any work commences on site, the INNS clearance contractor will remove all rhododendron ponticum from the working area.

Clearance of more substantial vegetation will then commence, beginning at the forestry haul road which dissects the centre of the site, a 13t excavator will be used to pull out tree stumps along the line of the penstock. Tree stumps will be placed to the side ready to be replaced upon reinstatement.

Trees will be felled along a 6m corridor up to the intake location. Felled trees will be removed to the laydown area by a timber forwarder and removed from site by a HGV.

The overgrown ATV track (see site map) is bordered by numerous young broadleaves which in places overhang the road. These will be pruned where possible or felled where necessary with chainsaws to facilitate access along the ATV track. Large trees will be removed from site and very small trees will be processed and stacked into habitat piles.

Vegetation clearance will take place outside of the nesting bird season.

3.5 – Intake Construction

Construction plant which will be required is as follows:

- 150Ltr Portable Electric Concrete Mixer
- Concrete Vibrator
- 5hp Petrol Generator
- Electric Water Pump with Screened Intake
- 13t excavator
- 12Ltr/s water pump
- Hydraulic rock breaker

3.51 – Intake Construction Methodology

Materials required for intake construction:

- 14t of ballast
- 115 bags (25kg ea) of cement (packaged in waterproof material)
- 6 x 3m lengths of 12mm rebar
- 6 x sheets of 10mm reinforcing mesh
- 10 x sheets of 18mm shuttering ply
- 14 x 3”x2” timber
- 2.5m of quarter height coander screen
- 1.5m^2 of 2mm stainless plate + hinges (for access cover and HOF plate)
- 13m of 450mm HDPE twin wall pipe
- 100 x sand bags
- 1t of coarse sand
- Heavy duty polyethene barrier membrane

The intake will be a steel reinforced concrete structure with a 2m weir crest. A stainless coanda screen will be installed to screen debris from the abstracted water.

Access to the intake area will be along the penstock route once vegetation clearance has finished. The final approach (~15m) to the intake area is along a steep bank. A 13t excavator will create a rough access track along this bank. Vegetation will be stripped first and placed separately so that the track can be fully reinstated upon completion of the intake. Prior to installing the track, silt barrier fencing will be installed between the track and the watercourse.

A 13t excavator will create a rough track suitable for tracked machinery to reach the intake. Turfs will be stripped and placed top-side up separately from sub-soil and rock.

Plywood, timber, concrete materials and steel reinforcing will be brought to the intake area by tracked dumper as needed. No significant quantities of materials will be stored at the intake location.

A sandbag bypass dam will be installed using the 450mm bypass pipe in order to create a dry working area.

The dry working area only contains small quantities of fine river sediment in some areas. This sediment will be cleared with hand tools to reveal the bedrock.

The intakes upstream wall and buttresses will be shuttered first.

Concrete materials will be brought from the laydown area, mixed 10m from the watercourse and poured into the shuttering by wheelbarrow.

After one week the shuttering and sandbag dam will be removed, with the intake now acting as the bypass structure.

The remaining walls will then be shuttered and poured.

Concrete will not be poured into the intake shuttering unless the river's flow rate is less than the bypass capacity and falling, with no significant rainfall forecast in the next 48hrs.

3.6 - Penstock Construction

The plant required for penstock construction is as follows:

- 355mm Butt Fusion Machine
- Portable Electrofusion Machine
- Portable 7.5kW Petrol Generator
- 13t tracked excavator
- 8t tracked excavator
- Hydraulic Rock Breaker
- 2t tracked dumper

The penstock will be constructed from HDPE. It will be ~1,528m in length with an OD of 355mm.

Pipes will be offloaded at the laydown area**.** They will be butt fused into 120m lengths and pulled out along the penstock route. Pipe ends will remain capped until they are electrofused together and buried.

The penstock will be laid from the intake down to the powerhouse. A 120m pipe string will be pulled to the intake by a tracked excavator and placed along the edge of the construction area.

A 13t excavator will begin trenching downhill towards the powerhouse.

Where present, turf and soil containing organic matter will be stripped first and placed to one side. Mineral soil and rock will then be removed down to the depth specified in the penstock trench documentation.

Once 50m of trench has been opened, an 8t excavator will begin lifting the pipe string into the trench and reinstating it. Mineral soil will be placed first with turf and soil containing organic matter placed at the surface.

After 120m, a second pipe string will be pulled into place and electrofused to the previously trenched string.

Excavation and reinstatement will repeat until the pipe string reaches the powerhouse.

3.7 – Turbine House and Outfall Construction

The plant required for the construction of the turbine house and outfall is as follows:

- 150ltr portable concrete mixer.
- 5kW portable petrol generator.
- 8t excavator

3.71 – Turbine House Construction Methodology

The turbine house will be constructed as per the approved design.

Access to the powerhouse will be from the haul road to the South East, via the overground ATV track and then the penstock construction corridor.

There are several mature/nearly mature oak trees in the vicinity of the powerhouse. RPA fences will be erected to protect these trees.

The powerhouse foundations will be excavated by an 8t excavator. Turf and soil containing organic material will be stored and then be used to cover the structure's turf roof.

Concrete and mortar materials will be brought to the powerhouse area by a tracked dumper. They will be mixed in a 150Ltr electric mixer.

A sandbag dam will encircle the outfall's working area to prevent concrete from being accidentally spilt into the watercourse.

Silt barrier fencing will be erected between the turbine house construction area and the water course if soil conditions require.

Prior to the foundation being poured a 450mm length of twin wall pipe will be buried to act as the tail race

Packaging waste will be removed to the site bins located in the laydown area at the end of each working day.

3.8 - Site Traffic

See traffic management document

4.0 – Habitat Restoration and Landscape Restoration

The development's infrastructure has been designed to minimise the effects of construction activities and the final structures on the habitat and landscape. No mass earth movements are required to gain access or facilitate construction and the total area of above-ground infrastructure is <20m^2.

Because of this, there should be little scope for significant changes to the landscape or habitat.

Stripped turf will be properly stored next to the area of excavation and where turfs are not present, organic soil will be kept separate from mineral substrates.

Before the site's closure, all areas disturbed by construction activities will be reinstated to as close to their original conditions as possible

- Levelling ruts created by off-road vehicles.

- Removing drainage ditches where the only purpose of the ditch is to facilitate construction activities (ditches will not be removed if doing so will negatively impact the forest crop).

- Ensure areas are graded in a way that prevents the build-up of standing water.

- Timber haul roads will be reinstated to their original condition.

- Where hand excavations must take place in a riparian area, effort will be made to ensure the banks grading does not result in slippages.