

# Community Hydro Scheme Site at Dalavich, Argyll

## Construction Method Statement

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## 1. RISKS TO THE WATER ENVIRONMENT & MITIGATION MEASURES

The construction works that require to be undertaken for the Dalavich hydro scheme have the potential to cause pollution or impact on the bed and banks of the watercourse and on the quality and quantity of the water. These works will be authorized through a simple license under CAR, which places a legal responsibility on the responsible person to ensure that works are taken out as documented and all reasonable measures are undertaken to prevent adverse impact to the watercourse.

The main impacts to the water environment that could occur due to construction activities are:

- Production of silt or fine sediment;
- Oil or fuel spillages; and
- Pollution due to concrete/cement.

The route of the access track is not yet known. Once the detailed design of the scheme and access routes are known, any potential effects can be assessed.

The main risk to the water environment during operation of the hydro scheme is the reduction in flows in the affected reach of the River Avich. This effect on the water environment has been minimised through design including allowable abstraction flows described in the previous section and is not considered to be significant.

The works will be carried out in accordance with the general best practice guidelines set out in Pollution Prevention Guidelines and by SEPA & SNH:

- PPG 1 General guide to the prevention of pollution
- PPG 5 Works and maintenance in or near water
- PPG 6 Working at construction and demolition sites
- PPG 7 Refueling facilities
- PPG 26 Drums and intermediate bulk containers
- SEPA Technical Guidance Note – On-site management of Japanese Knotweed and associated contaminated soils
- SNH best practice will be followed on site during construction, for example covering holes/placing escape ramps and sealing pipes at the end of each day
- Any conditions accompanying the CAR license

Construction activities will be managed under a Construction Environmental Management Plan (CEMP) and overseen by an Ecological Clerk of Works (ECoW). The site specific mitigation measures that will be included within the proposed works to reduce the potential pollution risks from each of the above sources are detailed in **Table 1**.

A surface water cut off ditch will be constructed around the site compound to prevent any clean water flowing across the site.

Welfare facilities will include a chemical toilet/portalo which will be routinely serviced to remove sewage off site. Site water supply will be via a trailer bowser and bottled water made available.

**Table 1: Sources of Risk and Mitigation Measures**

Source of Risk	Mitigation Measures
<p><b>Silt or fine sediment entering watercourses:</b> Generated by surface water runoff from working area. Results in:</p> <ul style="list-style-type: none"> <li>• Discolouration.</li> <li>• Increased sediment load.</li> <li>• Downstream deposition of fines.</li> <li>• Local impact on aquatic ecology due to reduction of light in water and deposition on bed.</li> </ul>	<ul style="list-style-type: none"> <li>• The majority of the works to be constructed in dry conditions away from flowing water.</li> <li>• The areas of topsoil strip to be progressive, reducing the relative area and times of disturbed ground exposed through the duration of the works.</li> <li>• Formation of tracks to include suitable cambers and cross-drains to ensure they do not form drainage channels.</li> <li>• Excavation activities will replace pre-existing turf as part of restoration, minimising any areas of exposed soil.</li> <li>• All the works will be supervised by personnel experienced in working within rivers and having been involved in similar works over recent years.</li> </ul>
<p><b>Oil or fuel spillage:</b> Storage and refueling activities. Plant working near watercourses.</p>	<ul style="list-style-type: none"> <li>• All fuel storage on site to be bunded, placed on an impermeable surface and be compliant with the Water Environment (Oil Storage) (Scotland) Regulations 2006.</li> <li>• All fuel to be stored at least 10m away from watercourses.</li> <li>• All refuelling of plant to be undertaken at least 10m away from the burn using a drip tray with suitable capacity as set out in PPG26.</li> <li>• A spill kit to be available for plant on site.</li> <li>• All plant to be inspected to ensure that they are clean with no leaks.</li> </ul>
<p><b>Concrete/cement:</b> Construction of intakes, header pond, thrust blocks, tailrace channel, scour protection and power house.</p>	<ul style="list-style-type: none"> <li>• All concrete pours to be undertaken in dry conditions where possible.</li> <li>• All formwork to be tightly sealed and tested to prevent leakage.</li> <li>• Relatively small quantities of concrete used.</li> <li>• Bulk of concrete used in areas where no surface water drains are present.</li> </ul>

Successful implementation of the mitigation measures will reduce the risk of pollution to the River Avich as a result of the site works. All of the recommended mitigation measures as set out in Table 1 will be monitored as part of the supervision of the overall works, which will be undertaken by the contractor. Should any pollution incidents occur as a result of the site activities, SEPA will be contacted.

#### **Access Tracks**

The main site access will be clearly marked as a construction access point. Existing hill tracks will be used and upgraded as necessary for the construction. New tracks will be formed above the pipeline routes, which will be reinstated to a narrow width capable of being used by a small all-terrain vehicle, such as a quad bike.

When developing the access tracks, a formal drainage system will be formed, including ditches, camber to shed water to the edges, frequent cross drains and trackside grips/offlets to prevent the tracks acting as a preferential drainage route and to protect the water environment. Any trackside discharge should pass through a silt trap or other similar measure in line with Sustainable Drainage System (SuDS) principles and spread over a buffer area before flowing into a defined watercourse. Water should not be allowed or encouraged to pond in the road where possible.

#### **Water Crossings**

Track water crossings will be temporary and comprise of a steel or twin wall culvert secured in place with sand bags. All temporary water crossings will be in accordance with CAR General Binding Rule 6 (GBR6 below).

**GBR6: Minor bridge construction.** A minor bridge is defined as a bridge having no part of its structure within the channel of a river, burn or ditch and constructed for the purpose of supporting a footpath, cycle route or single-track road.

Rules:

1. The works must not prevent the passage of migratory fish.
2. The works must not result in the heightening of any bank or the narrowing of the watercourse.
3. Within 12 months of the work starting, the bed and banks of the river, burn or ditch must be reinstated to their previous condition as far as possible.
4. All reasonable steps must be taken to ensure that the works do not result in increased erosion of the bed and banks of the river, burn or ditch.
5. There must be no construction in the channel. This means the bed and banks of the watercourse.
6. The abutments and support for the bridge should be set-back from the channel edge.

**GBR6: Temporary bridge construction or removal.** In addition to the conditions above for minor bridge construction, the following will apply.

Rules:

1. The GBR applies only to temporary bridges over a river less than 5m wide.
2. Temporary bridges should only be in place for less than 12 months.
3. If the temporary bridge involves the construction of a culvert, the culvert must not extend more than 10m along the length of the river, burn or ditch.
4. Any culvert used should not result in the narrowing of the watercourse (ie its diameter should exceed the natural channel width).
5. Within 12 months after the removal of the bridge, the bed and banks must be reinstated to their condition before the works started.

Any water crossings will avoid sensitive locations, areas which could lead to excessive ponding upstream, and necessary sand bag headwalls will be used to form mud splash guards to preserve the water environment in sensitive areas. Cut-off drains will be installed to intercept uncontaminated surface water and directed around any works thereby preventing it from entering the working area.

### **Water Intake**

The area of the bed where the intake will be constructed will be worked in the dry. A temporary cofferdam will be formed around the works area using either native material or sand bags. The water will then be diverted around the works, by pumping. Any material placed within the channel during the construction of the temporary works will be removed as soon as its function has been fulfilled in a manner which minimises pollution.

### **Concrete Works**

For the works that require concrete (primary intake and thrust blocks) concrete will be pre-mixed off site and transported dry to the works area where water will be added to the pre-mix and the concrete mixed close to the point of use.

Concrete at the turbine house will be delivered as ready-mix and poured for large volumes, with blockwork mortar being mixed as required on site. The concrete works will be poured into dry workings and the formwork will be tightly sealed to ensure that there are no concrete leaks to the water environment. All washing of equipment shall be undertaken in a closed system and any discharge of washings must be to land at a distance greater than 10m from any open water.

Once settled, the clean water from concrete washings will be pumped out to the wider area within the watercourse and the residual material will be excavated and removed from the hill by dumper. This residual material will be

disposed of to land where contours are leading away from any watercourses with supervisory control in accordance with GBR16 (below). Any breach of GBR16 may result in this activity requiring a license.

**GBR16: Direct discharge of pollutants into groundwater as a result of construction or maintenance works in or on the ground, which come into contact with groundwater.**

Rules:

1. No solid or liquid materials coming into contact with groundwater shall contain substances listed in CAR Schedule 2. This is with exception to drilling fluids used during the works, provided they do not result in pollution of the water environment.
2. No materials coming into contact with groundwater shall cause pollution of the water environment.

**Pipework**

The excavations from the pipeline will be placed temporarily on the downslope while the pipe trench is prepared to place the pipe. They will be sealed as soon as practical after deposition and until re-use for infilling to ensure quick stabilisation. The excavated turf will be placed on the top side of the excavation for use as reinstatement and used to reinstate the downslope of the reinstated track over the pipeline. The infill material will only use inert and non-toxic material, preferably the initial material.

Directional drilling maybe employed where possible and appropriate for deeper sections of the penstock.

The pipeline will be prevented from acting as a drainage conduit when open by having regular offset drains leading from it to allow water to be attenuated and pumped out as necessary.

**Tailrace**

A tailrace will be formed between the discharge from the turbine at the powerhouse and the final discharge back to the River Avich.

The tailrace downstream will be an open ditch. The line of the ditch and area for placement of arisings will be stripped and the turf set aside for use in restoration. The ditch will be excavated, the arisings landscaped nearby and the turf reinstated to the banks of the ditch.

At the discharge point, a 20mm fish screen will be constructed as per the CAR requirements.

**Refuelling**

All refuelling and maintenance of plant and machinery to be carried out in line with PPG7 and PPG26. The main refuelling point will be at the site compound. Fuel deliveries will fill portable bunded bowser at the compound on a designated impermeable and bunded area. Machinery will be refuelled from the compound where possible.

Fuel will be transported to where the machines are working by a suitable vehicle such as a tracked dumper. Refuelling from the portable bowser to individual machines will use drip trays and have spill kits available with each machine, and be at least 10m away from any open watercourse.

All machinery used on site shall be regularly maintained and inspected for leaks. Any leaks identified must be stopped, contained and repaired.

In the event of an accidental spillage of any polluting substance or the pollution of the water environment, the contractor will immediately notify the Project Manager and thereafter SEPA. Any works directly associated with the cause of the incident will be halted, the effects mitigated where possible and measures put in place to prevent recurrence.

