

Allt Easach Hydro

EIAR NON-TECHNICAL SUMMARY

for Green Highland Renewables Ltd

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Eden Environment Ltd

www.edenenvironment.com

Introduction

Green Highland Renewables Ltd (GHR) proposes to build and operate a small run-of-river hydro-electric generating station on the Allt Easach, which is about 8 km north-east of Bonawe, Argyll and Bute, and on one of its tributaries. As part of the planning process GHR was required to submit an Environmental Impact Assessment Report (EIAR) describing the likely significant effects of the scheme on the environment. This document provides a summary of the EIAR, written in non-technical terms. Interested readers are invited to consult the full EIAR for more details.

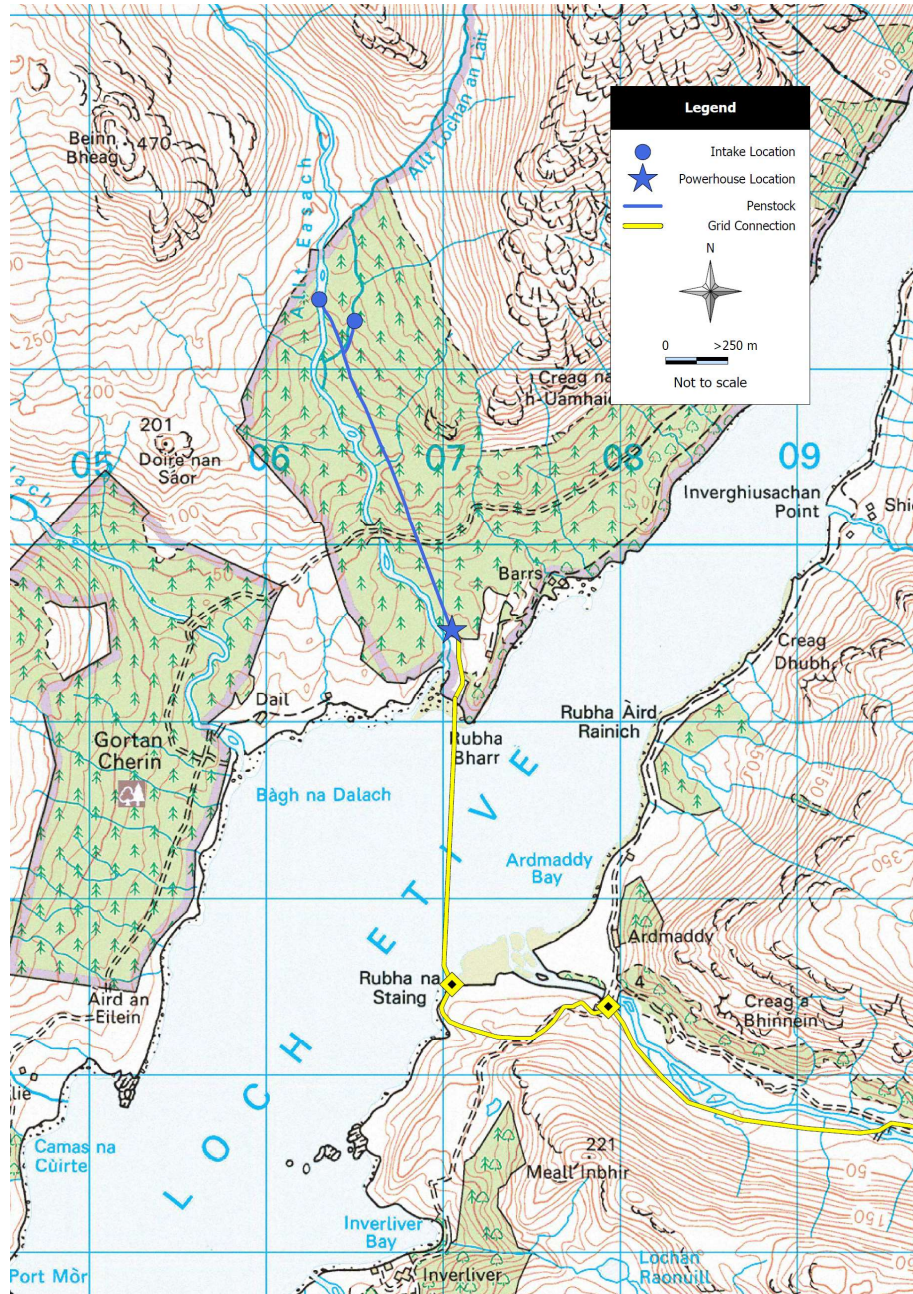


Figure 1 The site location.

The site

The Allt Easach drains the mountain and moorland to the west and south-west of Beinn Trilleachan, and flows southwards through the Forestry Commission's Barrs Plantation down to the north-west shore of Loch Etive at Rubha Bharr, at about NN 070 392, as shown in Figure 1.

The ground is mainly dense plantation conifers, more scattered at the north (higher) end of the site, denser in the mid- and lower levels, and with open ground nearer the loch shore. A network of forest roads serves the plantation and the small number of scattered buildings in the area.

Forestry Commission Scotland (FCS) plans to fell the timber in the Barrs plantation, starting in 2018 and continuing for a couple of years thereafter. The plantation would then be returned to semi-natural woodland mainly of birch, oak and Scots pine. FCS has similar plans for the nearby Cadderlie plantation, through which construction traffic would travel from the public road at Bonawe to the construction site in Barrs plantation.

What the EiAR considered

The contents of the EiAR were discussed in detail with Argyll and Bute Council (ABC), as the local planning authority; with Scottish Natural Heritage (SNH), as the government agency concerned with landscape and nature conservation; and with the Scottish Environment Protection Agency (SEPA) as the agency with particular responsibility for protection of Scotland's water resource. The EiAR was prepared in line with the requirements of these organisations, who were also consulted throughout the design phase prior to making the planning application.

The EiAR has been prepared in accordance with the guidance in Scottish Planning Advice Note 1/2013, as revised in June 2017. A number of people contributed to the studies reported in the EiAR, all of whom are qualified and recognised professionals in their respective fields.

Maps in this report

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Development description

Overview

In a run-of-river scheme, a proportion of the river water is taken from the river at an intake weir, piped downhill in a buried pipe called a penstock, and passed through a turbine before being returned to the river. The turbine turns a generator, which produces electricity which is exported (in this case) to the national grid via a buried and submarine cable. The general layout of the proposed scheme is shown in Figure 2.

Construction

Access to build the scheme would be along the existing FCS road which runs through Bonawe quarry and along the north-west shore of Loch Etive. Some small improvement works would be needed to make the road passable by the vehicles proposed. Heavy or bulky plant, materials and equipment

would be brought by landing-craft from Bonawe, where there is already a slipway, to Rubha Bharr, where a temporary slipway would be built. FCS would also export the felled timber from Barrs and Cadderlie via the slipway at Rubha Bharr, and will be building a new forest road to the shore down the east bank of the Allt Easach to access the slipway. FCS will remove this temporary slipway when felling operations are complete, which would be after the hydro scheme construction had finished.

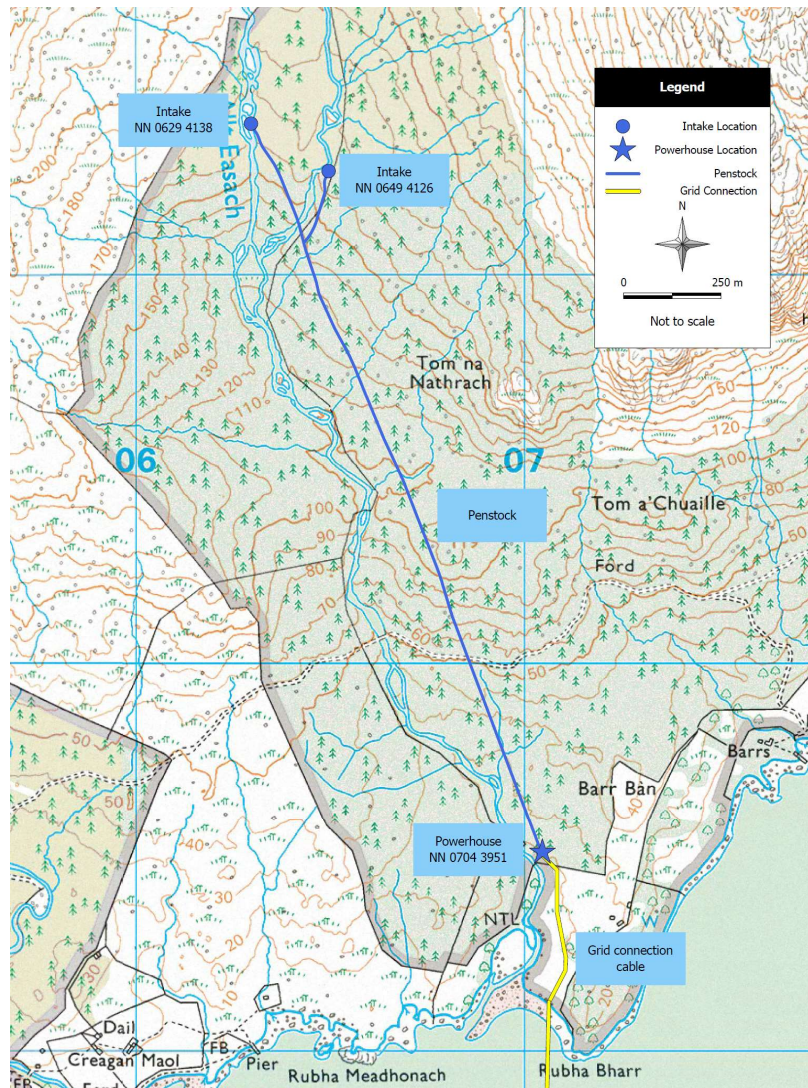


Figure 2 Scheme general arrangement showing grid references of main components.

FCS would leave in place some of the forest roads in Barrs plantation, for future forest management purposes, and one of these permanent forest roads would be used for access to the powerhouse during the operational period of the scheme. Similarly, a small existing track would be used for maintenance access to the intake, as well as a small section of new track. This would be used by maintenance staff on a quadbike, probably less than once a week.

Stone for constructing the scheme would be taken from the Bonawe quarry (for improvements to the access road on the north-west shore of Loch Etive), from existing borrow pits (for improvements to

the road in Cadderlie plantation), and from excavations such as the penstock trench (for construction requirements in the hydro scheme itself).

Construction of the scheme is likely to take in the order of 12 to 18 months.

Intakes

There would be two intakes: one on the Allt Easach (the west intake) and one on a tributary, the Allt Lochan an Lair (the east intake) – please see Figure 2. Each weir would be about 2 m high from the stream bed and about 15 m wide, and would consist of a low concrete structure spanning the river, fitted with a stainless steel perforated intake screen through which a proportion of the river flow would enter the intake chamber beneath. The design of the weirs would ensure that the scheme will never cause the rivers to dry out; abstraction of water stops before this can happen.

A small impoundment of water would form upstream of each weir, although these may soon fill with river sediment which would result in a more natural, rocky appearance of the surface of the water.

Operational maintenance at the intakes would consist of periodic visits to clear debris and clean the intake screens. These visits would be made by quadbike along the existing forest track and the new stretch of quadbike track to the intake site. At the end of life, the intakes would probably be left in place (the concrete would by then be pitted and faded and covered in moss and lichen) and the intake screens removed.

Penstock

The penstock would be buried in a trench all the way from the intakes to the powerhouse. Experience elsewhere shows that buried pipelines, properly constructed, are invisible within a couple of years of installation. Installation would, however, require a substantial trench to be excavated, with associated machinery movements and temporary storage of excavated turf and soil, from the intakes to the powerhouse.

The plan is to build the intakes first, using the line of the penstock as the access route for intake construction. Once the intakes are finished, the site would be cleared and the penstock installed down the same line that was used to get to the intake. The total working width of the penstock construction corridor would be about 25 m, but stripped turf would be stored outside this width to ensure it does not get damaged by machinery.

No operational maintenance should be required on the penstock, which would remain buried throughout its life. At the end of its life the penstock would be sealed and left buried.

Powerhouse and outfall

The powerhouse would be a timber-clad building with a dark grey profiled steel roof, set just inside the forestry plantation about 350 m from the shore of Loch Etive. It would be about 15m x 10m x 8m to ridge height. The outfall, about 25 m from the powerhouse on the riverbank, would be a submerged concrete structure which would discharge the water back into the river over an area of bedrock, where there is no risk of scouring the river bed or causing damage to habitats such as salmonid spawning grounds. The water would move from the powerhouse to the outfall by means of a buried pipe, known as the tailrace.

At the end of its life the equipment would be removed, the powerhouse would be demolished and the foundations and other buried structures covered with soil.

Grid connection

The scheme would be connected to the National Grid by cable via a connection building near Ardmaddy, on the south-east shore of Loch Etive. The cable would be buried from the powerhouse down to the shore, and then would be laid by specialist contractors across the floor of the loch. On the far side the cable would once again be buried until it arrives at the switchgear building. Here it would link with existing electricity supply infrastructure maintained by SSE.

Public access

The scheme would cross a popular walking and cycling route which runs along the shore of Loch Etive between Bonawe and Glen Etive to the north, and thence to Glen Coe. Public access over the existing paths would be maintained safely at all times during construction, although people may need to take notice of instructions from construction staff (and from FCS staff engaged in felling the plantation). The contractors would be under instructions to maintain a mobile crew whose dedicated task would be to maintain the road from Bonawe to Barrs, for public access recreational purposes and for the use of the local people. No closures of the road longer than a few minutes are planned

Consideration of alternative designs

The Allt Easach is hydrologically suitable to support a small run-of-river hydro-electric generating station, and no other form of energy generating scheme was considered for the location.

A number of options were considered for the layout of the proposed scheme. For example, the location for the west intake was modified to take account of a protected species resting site where animals could have been disturbed during construction. Similarly, the line of the penstock has been adjusted during the design process to reduce possible impacts on the river environment in the event of a pollution incident.

Several alternatives have also been considered for the construction process. Changes have included re-specifying the selected turbines to use two, smaller machines instead of a single larger machine; this allows the contractors to use smaller vehicles to transport the machinery to the site, and allows for a smaller powerhouse building. And every opportunity will be taken to combine transport requirements with the felling contractors, since they are likely to be using landing craft to export timber from Barrs plantation, and it may be possible to use the return journeys of the vessels to transport plant, equipment and machinery.

Ecology and nature conservation

The majority of the scheme, including the intakes, the penstock and the powerhouse, would be built in newly-felled plantation forestry of generally low nature conservation value. Nevertheless, full assessments were made of possible impact on habitats (including groundwater dependent terrestrial ecosystems, GWDTEs), bryophytes, fish and river ecology, mammals and birds. Effects on nature

conservation interests were discussed throughout the design phase with the regulators, in particular SNH and SEPA.

The assessments covered the construction phase (for example impacts caused by noise, machinery movement, mobilisation of sediment, pollution impacts, direct loss of habitat, disturbance of prey species and other factors), and the operational phase (for example impacts caused by depletion of the river flow, disturbance by maintenance and repair activities, noise from the operational turbine and other factors). The decommissioning phase, which would be 40 years or more in the future, was considered in less detail since the environmental and regulatory conditions which will prevail at that time cannot be predicted with any confidence.

Habitats

The scheme would impact on some of habitats of international and national importance, most of which are listed on the EU Habitats Directive and including BAP priority habitats. The main impact would be as a result of direct land-take for the constructed items, intakes, powerhouses and tracks, and disturbance from the pipe excavations. Other impacts are mainly due to indirect factors and the effects can be mitigated by careful design and construction management.

Woodland habitat of high sensitivity is present throughout the site, in particular near to the powerhouse, and on an island in the river to the south of the powerhouse, but the scheme has been designed to avoid wooded areas and significant trees. Other impacts to woodland and trees may be minimised by following basic mitigation described in the EiAR, chapter 6. The significance of impacts to woodland and trees is likely to be Moderate-Low or Low.

There is a GWDTE habitat and several acid flushes along the riverside and these have been avoided in the course of the design phase. The significance of impacts to flushes over the site as a whole, including marshy grassland and acid flush, is likely to be Moderate-Low or Low.

River and marine ecology

The scheme may affect river and marine ecology by alteration of flow and the wetted area between intakes and outfall due to abstraction, creation of barriers to fish migration at the intakes, entrainment of fish in the pipeline, construction effects on water quality, and engineering works on the sea floor. Species which are of particular concern include salmon and trout, lamprey, freshwater pearl mussels, and the marine species associated with burrowed mud habitats, including the fireworks anemone and the tall seapen. The effects of electromagnetic radiation from the submarine power cable were also considered in relation to migratory fish in Loch Etive, particularly near to the outfall of the River Kinglass near Ardmaddy.

The baseline conditions were established by means of walkover and electric fishing surveys of the rivers, and by an AUV (unmanned submarine) survey of the sea floor.

Salmon are largely absent from the Allt Easach. A single juvenile salmon was caught about 23 m upstream of the proposed outfall, but was thought to be an immigrant from Loch Etive. Trout were found throughout the river in mainly low densities, but there are relatively few places in the rivers which are suitable for spawning. Four eels were caught, but no freshwater pearl mussels or lampreys

were found. The burrowed mud habitat was found to be extensive across the surveyed area, and tall seapen and possible examples of fireworks anemone were seen.

During construction of the scheme, a number of measures would be put in place to ensure that the river habitats would be affected as little as possible. These include pollution and silt management measures, with regular inspections by an independent Environmental Clerk of Works, controls on refuelling, and management of coffer dams and the times at which the contractors are permitted to work in the river channel.

During operation of the scheme, the water abstraction would be controlled under the terms of a CAR (Controlled Activities Regulations) licence issued by SEPA. The abstraction would never cause the river to dry out, and in the opinion of specialist river ecologists is unlikely to reduce the wetted width of the river. The effects on river habitats during both construction and operation would be insignificant.

The design of the submarine cable crossing was revised following the sea floor survey. Proposals to bury the cable under the sea floor, or cover it with tipped rock, were abandoned due to the danger of damaging the burrowed mud habitat, and also due to rising concerns about mobilising stored carbon in the sediment. Instead, the cable would be laid across the sea floor, on a slightly modified alignment. It would be fitted with cast steel cable protectors in the shallows, both to protect it from near-shore boat traffic (and anchors), and to reduce still further the very small chance that electromagnetic radiation might interfere with the navigational capabilities of migrating fish and eels. Again, effects on the marine environment during both construction and operation of the scheme would be insignificant.

Mammals

The scheme may affect mammals by killing, injuring or disturbing them, or by destroying their habitat; or by similar effects on their prey species. These effects could be caused during construction by temporary habitat loss, plant and machinery operations, earthworks, pollution, sedimentation, and noise and movement; and during operation by permanent habitat loss, noise from the turbine house, or pollution by fuels and lubricants. The assessment focused on protected species, in particular otter, badger, pine marten, water vole and bats.

The potential for most serious impacts is during the construction period. The scheme has been designed in the light of the mammal surveys to avoid their most valuable habitat, for example by avoiding the riverbank as much as possible, and pre-construction surveys would be carried out to reinforce the existing surveys. During construction, an independent Environmental Clerk of Works would monitor measures to protect mammals, including avoiding creating traps in voids and excavations, careful management of pollutants, sediment management, observance of site noise regulations and other measures.

As with the habitats assessment, the mammals assessment is heavily influenced by the planned felling of almost the entire plantation in which the scheme would be built. By the time construction of the hydro scheme was begun, the ground would consist of the kind of felled forestry - stumps, brash and bare ground - that is familiar throughout upland Scotland.

Otter signs were found throughout the study area on and near watercourses and, especially, near the coast. No signs were found away from watercourses, but it is clear that otter activity is widespread in the proposed development area.

Pine marten are also active in the development area, in particular along river and track margins where the rough, damp, ungrazed grassland favours populations of field vole, the martens' favoured prey.

Badger have a similar distribution, based on their dietary preference for earthworms, carrion and amphibians. Three setts were found, two of them over 150 m from any scheme infrastructure. The layout of a significant part of the scheme was changed to ensure that there would be no disturbance of animals at the third sett.

No water vole were found, and the majority of the watercourses in the scheme area were judged to be unsuitable for water voles.

No bat survey was carried out, because no trees would be felled in order to construct the hydro scheme.

For all species, impacts would be insignificant. Mainly this is because the layout of the scheme has been designed to avoid sensitive sites - by passing through the felled area rather than along riverbanks and rides, for example - but also because of the distribution of species and their resting-up sites, and the measures that would be put in place to manage the environmental effects of construction.

Otter comprises a qualifying interest of the Loch Etive Woods Special Area of Conservation (SAC), the boundary of which is within 100 m of part of the scheme at one point. A Habitats Regulations Appraisal was carried out in relation to this aspect of the scheme. It was concluded that the proposed scheme would cause no likely significant effect on otter populations in the SAC, because the relevant site is partly screened from the construction works and there would be no direct effect upon it.

Ornithology

The scheme may affect birds by disturbing their breeding activity during construction or operation of the scheme, by permanently or temporarily removing breeding, roosting or foraging habitat, or by indirect effects due to impacts on prey species. As with mammals, the planned felling of the Barrs plantation forest has a major effect on the assessment of the hydro scheme's impacts on birds, since by the time construction of the hydro scheme had begun, the ground over which most of it would be built would consist of felled forestry of little value to birds.

Measures would be put in place during construction to minimise any adverse effects on birds. For example, depending on the timing of works, pre-construction nesting bird surveys may be needed. Vegetation clearance would be scheduled outside the breeding season, to avoid disturbance or injury to nesting birds.

All bird species were considered, but special attention was paid to golden eagle, which are the qualifying interest of the Glen Etive and Glen Fyne Special Protection Area (SPA), the boundary of which is about 150 m from the west intake.

Felling activity in the Barrs plantation may cause a short-term disturbance to eagles, and the regenerated land cover may not be particularly valuable to them; this may not matter, since the

relevant eagle's range appears to be viable without this woodland, which is of low value to eagles. Felling is also likely to result in habitat loss for the other species which currently inhabit the conifer forest, and when the new broadleaved and Scots pine woodland replaces it, a new assemblage of birds is likely to move into the area from the surrounding moorlands. These are the future environmental conditions against which the effects of the hydro scheme have to be judged.

The lack of importance of the plantation forestry to eagles, and the very large size of their range, means that disturbance effects due to hydro construction are likely to be negligible at worst. No known nest is within the recommended minimum distance between golden eagle nests and construction activity, and impacts on prey species are likely to be small in the hydro construction area, and prey would be unaffected across the remainder of the eagles' range.

For other species, the impacts of construction of the hydro scheme on breeding birds, foraging birds and habitat would be negligible in the context of the more widespread effects of plantation felling.

During operation of the built scheme, there would be no effect on the SPA, its habitats or golden eagle as the qualifying interest. There may be a slight beneficial effect on golden eagle as a species, caused by the transition of the forest from mature plantation, through clearfell to semi-natural woodland - but this benefit would not be due to the hydro scheme.

For other species, operational activities would cause no impact.

Bryophytes

A walkover survey for bryophyte species was carried out. The ground which would be affected by the hydro scheme was found to have a very limited bryophyte flora, and consequently any impact caused by the scheme would not be significant.

Landscape character and visual amenity

Although it runs through commercial plantation forestry, the Allt Easach is close to (but not inside) the Ben Nevis and Glen Coe National Scenic Area (NSA) and the Loch Etive Mountains Wild Land Area (WLA). The landscape character and visual impact assessment (LVIA) considered impacts on the landscape, including the NSA, the WLA, the published landscape character area and type descriptions, and the visual amenity of people in the area.

As with the nature conservation assessments, the planned felling of the Barrs plantation has an important effect on the way the assessment is carried out. Regardless of whether the hydro scheme is built, the plantation will shortly be transformed from a mature conifer forest to a clear-felled area of stumps, brash and bare ground, thereafter gradually changing over a number of years into a semi-natural woodland of oak, birch and Scots pine. Construction of the hydro would be within the clear felled area (with felling continuing in the surrounding forest compartments at the same time) and therefore the excavations, construction activity and restoration of the site would be far less noticeable than they would be in undisturbed forestry.

The aspects of the scheme which would be likely to affect landscape character and visual amenity are the disturbed ground in the construction site; movement of people and machinery on the construction site; construction traffic on the road from Bonawe to Barrs; the new (temporary) landing craft pad on

the shore at Rubha Bharr, temporary site huts at the compounds, new permanent structures consisting of the intakes, powerhouse and outfall, a short length of new quadbike track from an existing forestry track to the intakes, and periodic maintenance activity during the operational period.

The area from which the scheme might be visible would be quite extensive during the construction period, largely because much of the surrounding forestry would have been felled, and moving, brightly-coloured vehicles and plant are (by design) easy to see. After the site is complete and the site restoration has matured (and especially after the semi-natural woodland has begun to regenerate) the scheme would be far less visible: the penstock would be fully buried, and only the intakes, powerhouse and outfall, and a short length of quadbike track to the intakes, would remain visible.

A number of measures are proposed to reduce adverse effects. By design, the scheme has avoided a number of effects through the placement of elements in the best available locations - for example the positioning of the powerhouse at the edge of the existing plantation forestry (and future semi-natural woodland). The construction method statements (drafts of which are submitted with the planning application) include comprehensive instructions and requirements of the contractors for site restoration, including ensuring that excavations are restored with the correct soil horizons, boulders are replaced (where possible) in their original locations and orientations, and ground profiles built up to match the surrounding ground. Screen planting of trees is specified at the powerhouse to augment the FCS tree planting following the plantation felling, and the building would be faced with natural timber to reduce its visual impact. Finally, all of these measures would be supervised throughout construction by an independent Landscape Clerk of Works (LCoW).

Landscape character

Generally, the landscapes in the area are considered to be highly sensitive because of their designation as, or proximity to, NSA and WLA. The effects upon them caused by construction of the scheme, however, would be very small, largely because it would take place in an already-degraded landscape, it would be short-term and it would be reversible. Overall, the effect would be adverse, but not significantly so.

During operation the effects of construction would largely disappear, and the re-growth of the semi-natural woodland would mostly conceal the permanent upstanding elements of the scheme. Again, the overall effect would be adverse, but not significantly so. Over time, the effect would continue to decline, and from many areas the scheme would not be noticeable.

A specific Wild Land Assessment was carried out in accordance with current SNH methods. The assessment was based on the description of the WLA published by SNH. The assessment concluded that there would be no physical effect on the WLA because the scheme would be outside the WLA boundary; the key characteristics (mainly relating to the landscape-scale mountain scenery and landforms) have a low sensitivity to the kind of change a small run-of-river hydro scheme could cause, and in any case they would be remote from the WLA itself; and the only people likely to be affected would already be in the degraded landscape of the felled plantation. Overall, the effect of the proposed scheme on the wild character of the WLA would not be significant.

Areas of Panoramic Quality, designated at the local level by Argyll and Bute Council, were not considered in detail because they do not appear to be supported by a published evidence base.

However, the land covered by this designation was considered under the headings of the Landscape Character Types and Landscape Character Areas.

Visual amenity

The visual amenity assessment considers the way people's views would be affected by the proposed scheme. Three categories of people are normally considered, up to a distance of 1 km from the scheme: People who live in the area, people at work or at leisure in the area, and people who are travelling through the area simply to get somewhere else. There are a small number of scattered dwellings and bothies in the area but no permanent residents, and people passing through are either there for work (forestry, gamekeeping etc.) or for leisure. Therefore only the second category was considered within the 1 km buffer: people at work or at leisure, which includes people in the bothies and holiday homes.

However, people living at Ardmaddy, on the far side of Loch Etive, were considered as a precautionary measure. They are over 1.6 km from the nearest part of the scheme (the temporary slipway) and any effect on them would be negligible at worst. Most of the scheme construction works would be out of sight, and the whole site would be out of sight once the new semi-natural woodland began to develop.

People stay in the area for leisure purposes at a number of places: the holiday cottage at Barrs, a Scout bothy near Rubha Bharr, wild campers on the shore near Rubha Bharr (and possibly at other places), and at the off-grid holiday cottage at Dail. Direct views of construction activity would be had only from the wild campers' site; and it is felt somewhat unlikely that people would want to camp there in the midst of the felling activity that would already be in hand when hydro construction began. If they did choose to camp there, it would likely indicate that they are not concerned about the nearby felling operations - and hence, neither by the hydro construction activity.

Construction activity could be seen by people at the bothy only by leaving the building and walking up a small knoll to the west of the building. No construction activity would be seen from either Barrs or Dail, but people at both of these properties (and the bothy) would very likely encounter construction traffic on their way in and out of the site, along the road from Bonawe. It is worth remembering that the major change in views for all of these people would be the plantation felling, which would start before hydro construction began, and continue after hydro construction finished.

People visit the glen for walking, cycling, climbing (particularly on Beinn Trilleachan), bird-watching, canoeing, shooting, stalking, fishing and other activities; and people such as gamekeepers and estate workers, forestry workers, builders, land managers and others work in the glen. Effects on all of these people were considered, and all effects were assessed as being insignificant. Reasons include the relatively short duration of exposures to views; the individuals' concentration on the task in hand, such as climbing or fishing; the long distances; and the relatively small effect of the scheme set in the wider context of the felled plantation.

Cultural Heritage

Extensive civil engineering works have the potential to affect both upstanding heritage features and buried archaeology, whether previously known or unknown. As with other topics, the historical and future forestry activities are significant to the assessment: ploughing, planting, thinning, felling and

extracting timber all have the potential to damage or destroy archaeology, and also make archaeological survey very challenging in dense plantation forestry. Nevertheless, a desk-based study and a site walkover were carried out. Features of interest were found only in the lower, southern parts of the proposed scheme, in the area of the powerhouse.

The only feature likely to be affected is a drystone dyke which would be severed by installation of the buried cable from the powerhouse to the shoreline. GHR has agreed to arrange for an archaeologist to record the dyke as it is cut, and it may also be possible to rebuild it after the cable is installed.

Access and recreation

People travelling into the glen and through the construction site may be affected by construction activity. The scheme would cross the main forest road which runs along the north-west shore of Loch Etive, and people may encounter plant and machinery, have to divert around working sites, have to wait while a task is finished, or have to traverse rough ground which may have been churned by machinery. All of this would be in the context of a busy working forest which would be in the process of being felled and the timber exported.

GHR has prepared a Public Access Management Plan which specifies the measures to be taken by the contractors to ensure that people are inconvenienced as little as possible. Measures include toolbox talks to the workforce by the Landscape and Environmental Clerks of Works; information and warning signs; provision of alternative routes and diversions; protection of open excavations; and regular maintenance of the access roads by a dedicated crew.

Summary and conclusions

The assessment has shown that:

- For many issues (for example bats) there would be no impact.
- For the remaining issues (for example landscape character) impacts would be insignificant.
- The scheme would cause no residual significant impact.